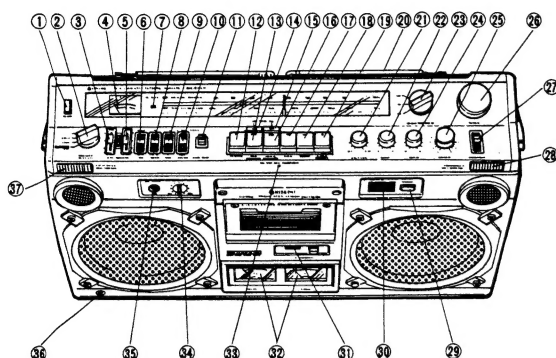


SERVICE MANUAL

No. 1221

893

KEY TO ILLUSTRATIONS



- | | |
|--------------------------------|--------------------------------|
| ① LIGHT BUTTON | ⑲ STOP/EJECT BUTTON |
| ② FUNCTION SELECTOR | ⑳ TELESCOPIC ANTENNA (AERIAL) |
| ③ RECORD LEVEL CONTROL (LEFT) | ㉑ BALANCE CONTROL |
| ④ TUNING/BATTERY METER | ㉒ BASS CONTROL |
| ⑤ RECORD LEVEL CONTROL (RIGHT) | ㉓ BAND SELECTOR |
| ⑥ REC MANUAL SWITCH | ㉔ TREBLE CONTROL |
| ⑦ FM STEREO INDICATOR | ㉕ VOLUME CONTROL |
| ⑧ TAPE SELECTOR SWITCH | ㉖ TUNING CONTROL |
| ⑨ RIF SWITCH | ㉗ LOUDNESS SWITCH |
| ⑩ MODE SWITCH | ㉘ BUILT-IN MICROPHONE (RIGHT) |
| ⑪ RECORDING MUTE SWITCH | ㉙ PROGRAM SWITCH |
| ⑫ PAUSE BUTTON | ㉚ PROGRAM INDICATOR |
| ⑬ FAST FORWARD/CUE BUTTON | ㉛ TAPE COUNTER |
| ⑭ PROGRAM SELECTOR BUTTON (◀) | ㉜ LEVEL METER (RIGHT AND LEFT) |
| ⑮ PROGRAM SELECTOR BUTTON (▶) | ㉝ OPERATION INDICATOR |
| ⑯ REWIND/REVIEW BUTTON | ㉞ MIXING VOLUME CONTROL |
| ⑰ PLAYBACK BUTTON | ㉟ MIXING SOCKET |
| ⑱ RECORD BUTTON | ㊱ HEADPHONE SOCKET |
| | ㊲ BUILT-IN MICROPHONE (LEFT) |

SPECIFICATIONS

GENERAL SECTION

Semi-conductors: IC's: 16
Transistors: 23
Diodes: 27
LED: 2

Power(Mains) Supply: AC: 220V, 50 Hz [For E]
240V, 50 Hz [For E(BS)]
DC: 12V (IEC R20 x 8)
Car: Use car battery adaptor

Power (Mains)
Consumption: 21W
Dimensions: 532(W)x316(H)x161(D)mm
Weight: 7.5 kg (with batteries)
Power output: 5W/CH (max.)
Speaker: 16 cm, 3.2 ohms x 2
5 cm, 8 ohms x 2

TUNER SECTION

Circuit System: FM/SW/MW/LW 4-band superheterodyne

Tuning Range: FM: 88 to 108 MHz
SW: 6.0 to 18 MHz
MW: 530 to 1605 kHz
LW: 150 to 350 kHz

Sensitivity: FM: 10 dB (pra.) 2 dB (max.)
SW: 25 dB (pra.) 20 dB (max.)
MW: 42 dB (pra.) 30 dB (max.)
LW: 52 dB (pra.) 40 dB (max.)

Intermediate Frequency: SW/MW/LW: 465 kHz

Antennas(Aerials): FM/SW: Telescopic antenna or External antenna
MW/LW: Ferrite-core antenna

TAPE RECORDER

Tape: Cassette tape (C-30, 60, 90)

Tape Speed: 4.75 cm/s

Recording System: AC bias

Erasing System: AC erasing

Track System: 4 track 2 channel

Frequency Response: Normal: 50 ~ 10,000 Hz
CrO₂: 50 ~ 12,000 Hz

S/N(Signal to Noise Ratio): 50 dB

Cross Talk: 72 dB

Erase Ratio: 65 dB

Input Sensitivity and Impedance: Microphone: -55 dB, 500 ohms
Phone: 50K ohms
Record/Playback(DIN): 60 mV, 50K ohms

Output Level and Impedance: Record/Playback (DIN): 700 mV, 10K ohms
Ext speaker: 3.2 ohms

Fast Forward or Rewinding Time: 120 sec (Using C-60)

Distortion: 3%

Motor: DC micromotor

CASSETTE TAPE RECORDER WITH FM/SW/MW/LW RADIO

JUNE 1979

894

SAFETY PRECAUTION

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers. Critical parts are marked with \triangle in the schematic diagram and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

DRPS (Digital Random Program Selector)

DRPS detects the non-recorded sections between music recorded on the tape and automatically selects and plays back desired tunes up to 9 tunes before or after the tune being played back at present.

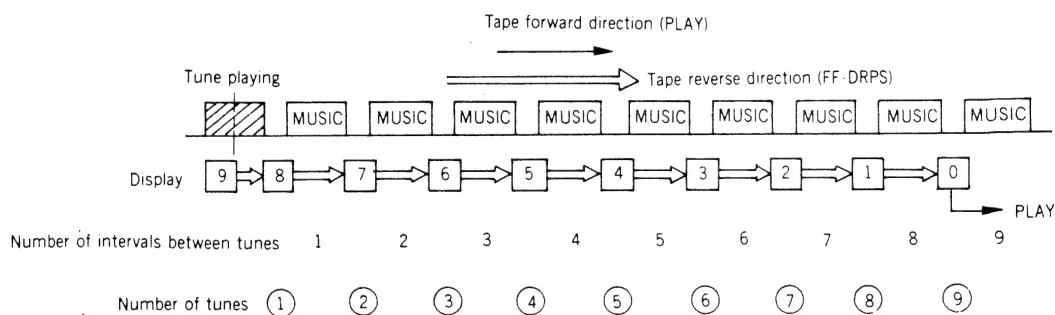
The tune-selection system is different depending on the direction, whether you are selecting tunes in the FF direction or the REW direction.

To select the n-th tune in the FF direction, assuming the tune being played back at present to be "0", set the indication of the program indicator to "n".

To select the n-th tune in the REW direction, set the indication of the program indicator to "n + 1".

Fig. 1 and 2 show the selection of tune and the program indicator display during the DRPS operation in the FF and REW directions.

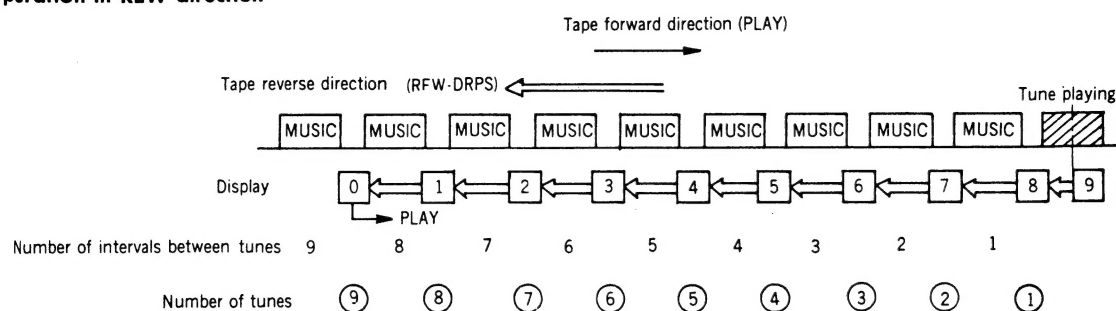
DRPS Operation in FF direction



The above is an example of the operation with the indication set to "9" in FF-DRPS.

Fig. 1

DRPS Operation in REW direction



The above is an example of the operation with the indication set to "9" in REW-DRPS.

Fig. 2

Outline of mechanism

The DRPS mechanism has been added to the conventional MZ type mechanism provided with Full-Auto/Review/Cue. When the DRPS mechanism is operated, the Cueing or Review mode for the inter-tune gap detection is held until the program indicator displays "0".

When the FF or REW button and the DRPS button are pressed simultaneously during PLAY, the solenoid operates to draw back the lock-plate which locks the DRPS operation slider, to lock it. The FF or REW operation button is locked together with the DRPS operation slider corresponding to the operation button. When the program setting is operated by mistake and the indication of the program indicator does not indicate "0" at the tape end during DRPS operation, the mechanism enters the STOP mode. (The Auto-stop mechanism does not operate during ordinary Review or Cueing operation.)

The AS cam gear and AS gear of the Auto-stop mechanism are engaged by means of the movement of the lock plate which locks the operation slider and the auto-stop mechanism to the operation mode.

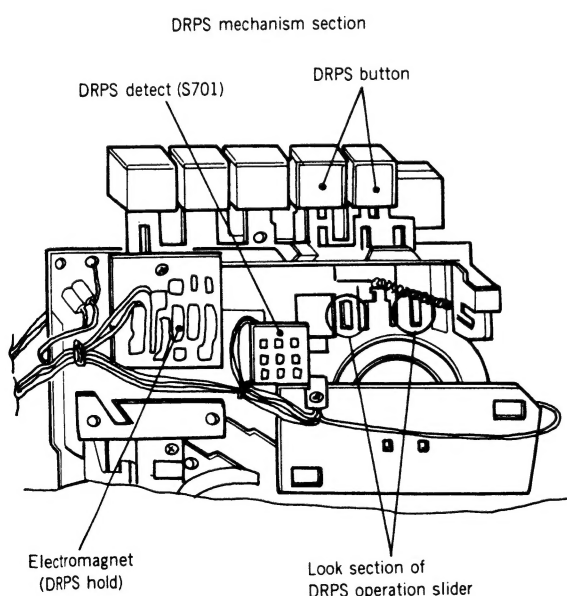


Fig. 3

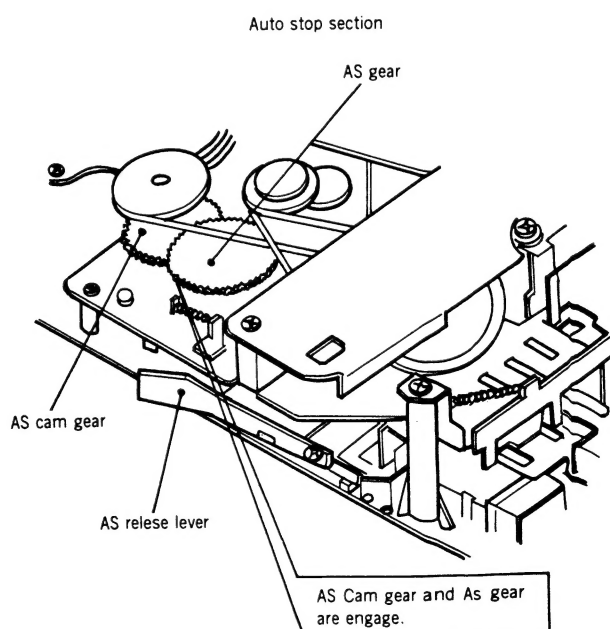


Fig. 4

Outline of the DRPS circuit

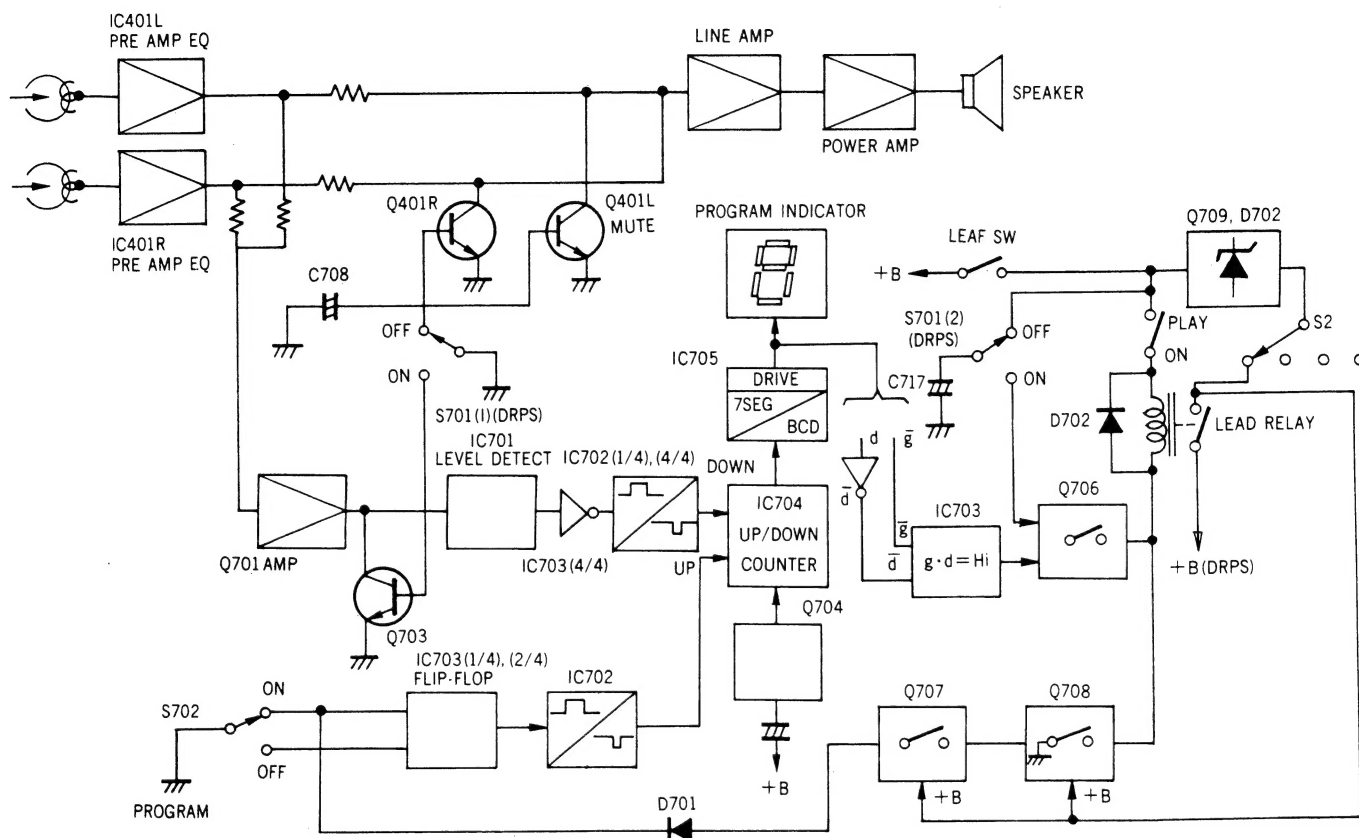


Fig. 5

Outline of the circuit

Fig. 5 is a block diagram of the DRPS circuit.

The circuit is designed so that the review or cueing mode is counted down from the count value of the selected program every time an inter-tune gap is detected and the indication is held until just after the indication becomes "0".

1. Play signal detector circuit

This circuit mixes the channel outputs of both IC401L/R, supplies it to Q701 to amplify it. From these, it is supplied to IC701, which has an output of Lo (0V) with an input level of less than -35 dB, and an output of Hi (5V) with an input level of more than -35 dB.

To prevent operation from stopping for short nonrecorded sections during the music, the variation of the output is delayed when the input reduces abruptly. This delay time is determined by the time constant of C707 and R709 connected to terminal (2) of IC701.

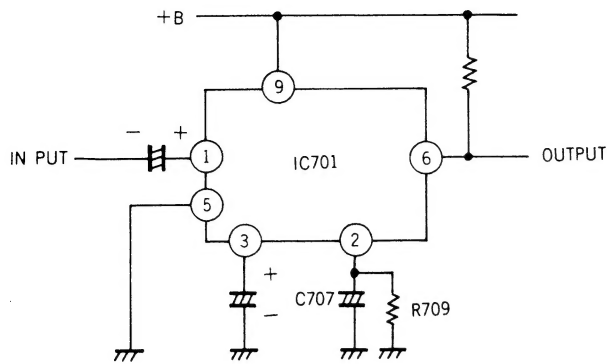
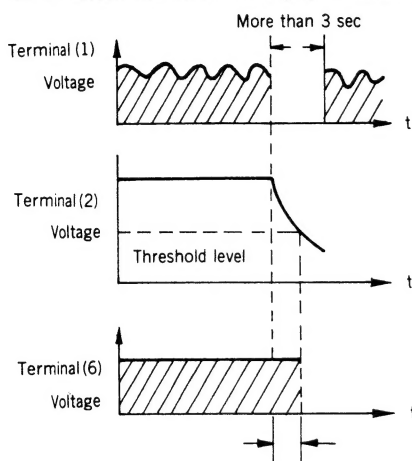


Fig. 6

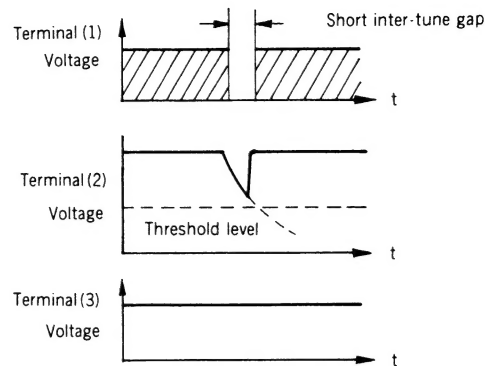
Output of IC701 when the inter-tune gap is more than 3 sec



Delay time : Determined by the time constant of C707, R709.

Fig. 7

Output of IC701 when the inter-tune gap is too short



Output when the inter-tune gap is short.

Fig. 8

* Shows the time with a tape speed of 4.75cm/sec. Since it starts cue/review operation during DRPS, and the tape speed at the winding start and the winding end differ, the inter-tune time becomes 0.11 sec min, 0.3 sec. max.

This signal is inverted by IC703, and in addition to it, when the output level is reduced to Lo from the Hi potential the negative polarity pulse is generated by the pulse generator circuit (integral/shaping circuit) composed of (1/4), (4/4) of IC702. This negative polarity pulse is supplied to the count-down instruction terminal of the counter (IC704).

The counter counts down every time the negative pulse is input. In this case, terminal (5) (count-up instruction terminal) of IC704 is set to Hi potential.

2. Muting circuit

The DRPS operation detects the inter-tune gap in the PLAY signal in the Cue or Review mode.

In the meantime, the play signal output from the speaker is muted and the play signal is supplied only to the DRPS circuit.

The play signal to the DRPS circuit is muted for approx 0.4 sec from the time when DRPS operates, to prevent misoperation of the initial DRPS operation. That is, when the DRPS button is pressed, S701-(1) is changed over to the ON side, so the charge held by C704 is discharged via R710 and the Play signal is muted until it becomes to less than the threshold level of Q703.

The muting for 0.4 sec during Cue or Review corresponds to approx. 4~10 sec when converted to the play mode, so when the inter-tune gap is less than this time, the tune selection function does not operate.

Q401 R/L shown in Fig. 5 is for speaker output muting, and Q703 for the DRPS circuit input signal muting.

3. Program setting & Selection number storage circuit

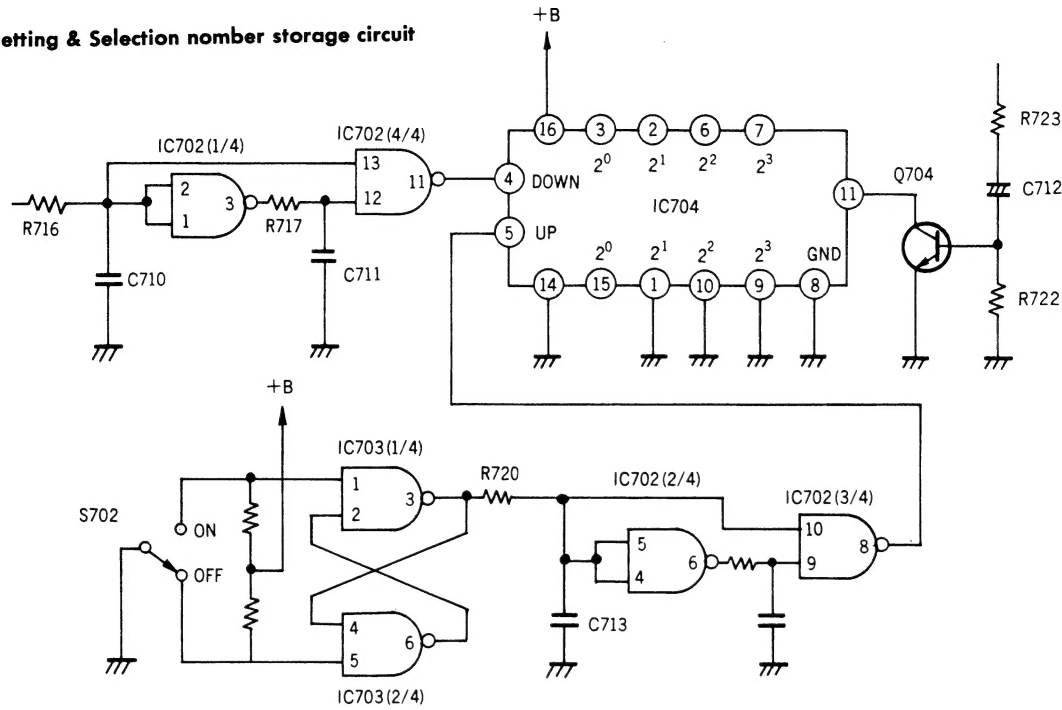


Fig. 9

The flip-flop composed of (1/4), (2/4) of IC703 prevents the mis-setting of the program caused by chattering when the program switch (S702) is pressed. In addition, a negative pulse is generated when the input is changed to Lo from Hi by the pulse generator circuit composed of (2/4) and (3/4) of IC702, and this pulse is supplied to the count-up instruction terminal of the counter (IC704). Count-up is done every time ON changes to OFF when the ON/OFF of S702 is repeated. In this case, terminal (4) (count-down instruction terminal) is set to Hi. Q704 keeps terminal (11) of IC704 at Lo for the time until the potential of R722 caused by current flowing to C712 drops to the threshold level, when power is applied to the DRPS circuit. When terminal (11) of IC704 is changed to Lo from Hi, each memory inside 4-bit counter is set depending on the level applied to terminals (9), (10), (1), (15). In this unit, terminal (15) of IC704 is set to Hi and terminals (9), (10), (1) to Lo so that the initial display of the program indicator is "1" when the DRPS is operated. ((9) : 2³, (10) : 2², (1) : 2¹, (15) : 2⁰). The output of IC704 is the digital amount corresponding to the binary 4-digit number. Terminals (7), (6), (2), (3) show the counter output, terminal (7) MSB, terminal (3) LSB. These output codes of decimal values are shown in Table 1.

Table • 1

Decimal value	Terminal ⑦ (MSB)	Terminal ⑥	Terminal ②	Terminal ③ (LSB)
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

0 : 0V 7 : 5V

Decimal value : Same value as the display of program indicator.

4. Program indicator circuit

IC705 converts the binary 4-digit (BS code) output from IC704, to the 7-segment decimal indication output of the program indicator and drives the LEDs.

The segment outputs of IC705 are set to Lo (Open collector) to drive the respective segments.

Terminal (3) of IC705 shows the lamp test input.

That is, when this terminal is set to Lo, the indication shows "8" because the 7-segment output becomes Lo.

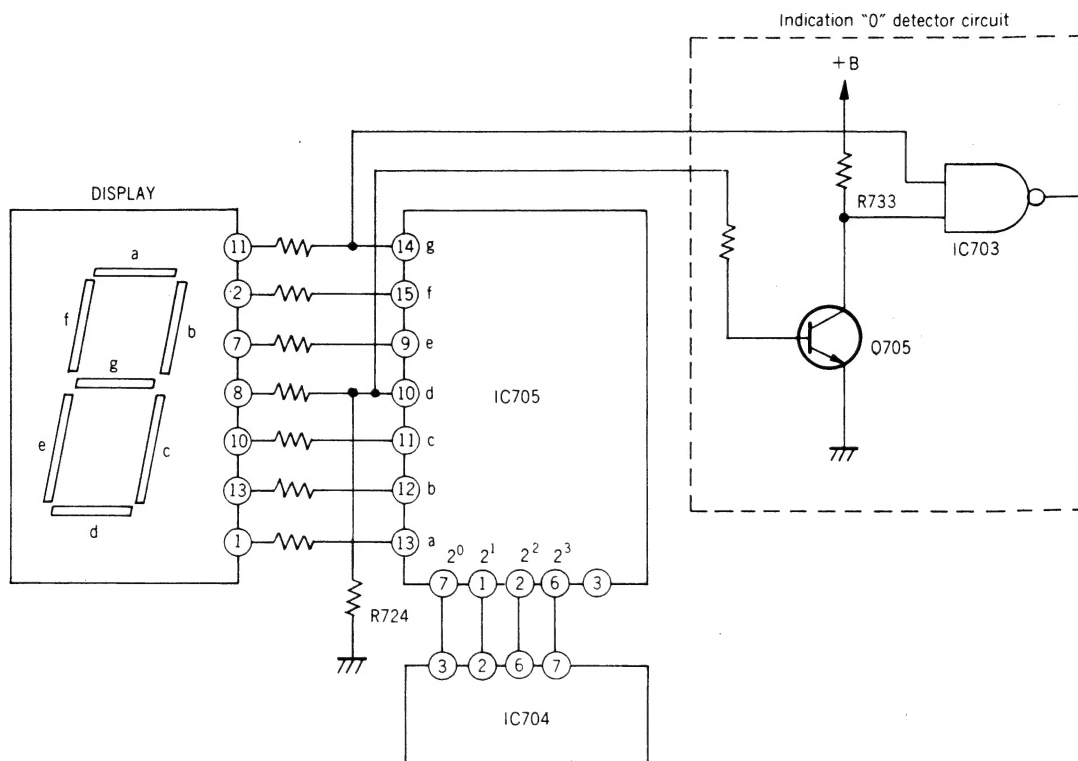


Fig. 10

5. Indication "0" detector circuit

Table 2 shows the codes of the 7-segment program indicator display. Since only segment (g) is not lit, detection of the condition of this segment (g) will do, to detect the indication "0" from this code. However, when 1 and 7 are displayed, segment (g) does not light, so the potential of 2 segments, which also do not light when 1 or 7 is displayed but light with "0" displayed, ((e) or —(d)), are detected via a NAND circuit. Furthermore, segment (d) is supplied to the NAND circuit via the inverter composed of Q705, to obtain the Lo potential when only the indication is "0".

Indication	Segment Output						
	a	b	c	d	e	f	g
0	0	0	0	0	0	0	1
1	1	0	0	1	1	1	1
2	0	0	1	0	0	1	0
3	0	0	0	0	1	1	0
4	1	0	0	1	1	0	0
5	0	1	0	0	1	0	0
6	0	1	0	0	0	0	0
7	0	0	0	1	1	0	0
8	0	0	0	0	0	0	0

Table • 2

6. Solenoid drive circuit

The solenoid turns on the reed relay, which controls the power supply to the circuit, by use of its magnetic field when the DRPS function is operated. At the same time, the solenoid locks the DRPS slider until the program indicator displays "0" when the mechanism is set to Cue or Review. Power is supplied to the DRPS circuit by pressing the DRPS button or the program switch with the Play button pressed and the selector knob at TAPE.

1) Operation when the program switch is pressed When program button (S702) is pressed, Q707 turns OFF, Q708 ON, so the solenoid operates and power is applied to the DRPS circuit. Since "1" is set to the counter (IC704) when power is applied, the program indicator indicates "1" and the output terminal (11) (IC703) of the indication "0" detector circuit is set to Hi.

With this Hi potential Q706 stays ON until the indication of the program indicator becomes "0", so the solenoid operates and power to the DRPS circuit is maintained.

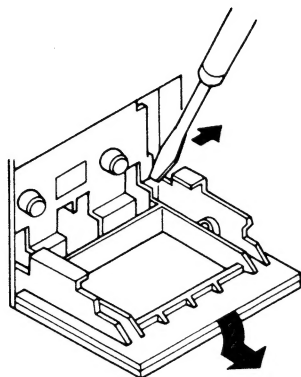
2) When the DRPS button at the FF or REW side is pressed in the PLAY mode.

When this unit is in the PLAY mode and the DRPS function is operated, the 12V potential is charged to C717 because S701 shown in Fig. 5 is OFF.

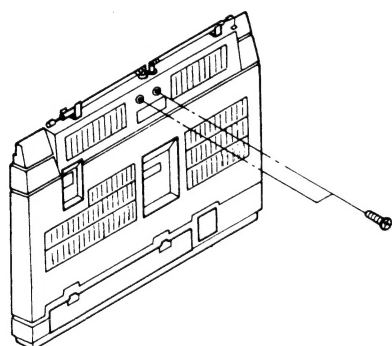
With the DRPS button pressed, S701 is changed over to ON, displays, so Q706 and the solenoid operate until the program indicator displays "0" by means of the potential of C717, to supply power to the DRPS circuit and lock the DRPS operation slider simultaneously.

DISASSEMBLY

1. Cassette lid

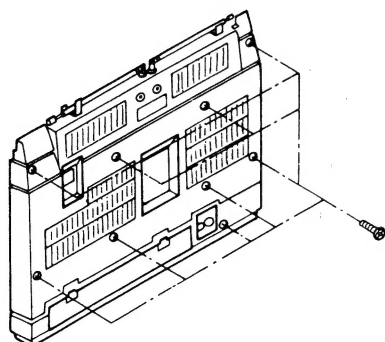


2. Telescopic Antenna



Note: The lead wire connected to the rod antenna is tightened together with the rod antenna fixing screw. It is designed so that the wire cannot be removed when the rod antenna is pulled out.

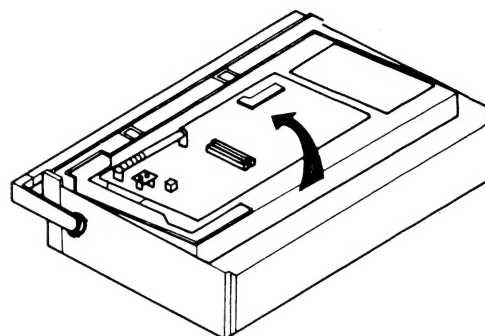
3. Rear Case



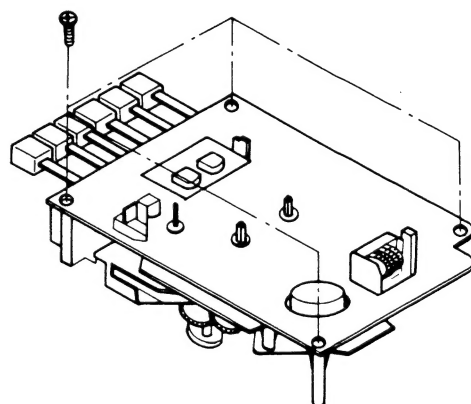
4. Main Chassis

Remove the selector switch knob, level control knob and tuning knob.

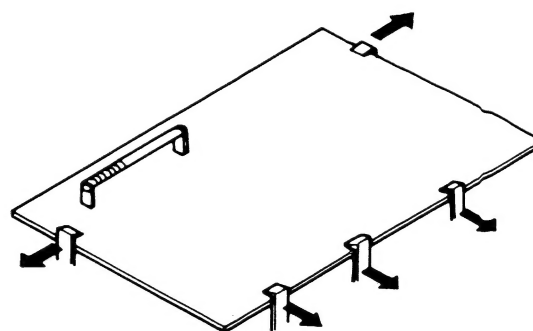
Press the eject button to release the engagement of the mechanism and cassette lid. Then lift up the battery side of the main chassis.



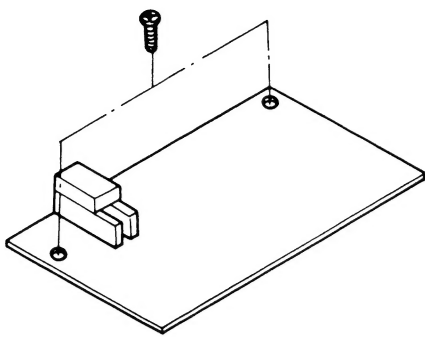
5. Cassette Chassis



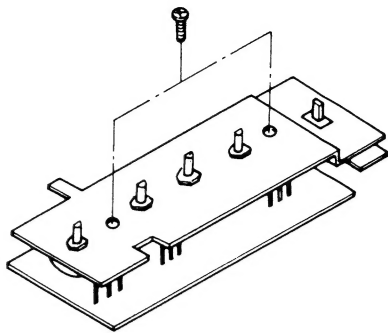
6. Main P.C board



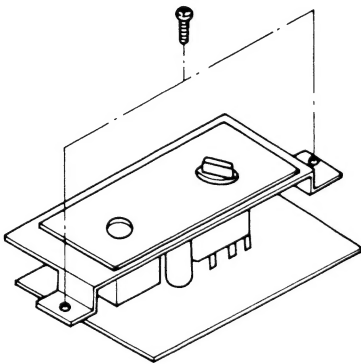
7. DRPS P.C. board



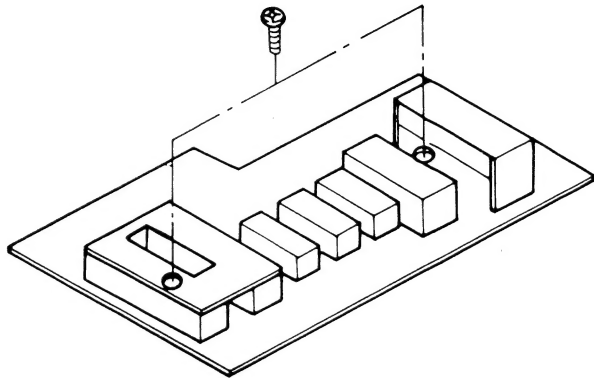
9. Volume P.C. board



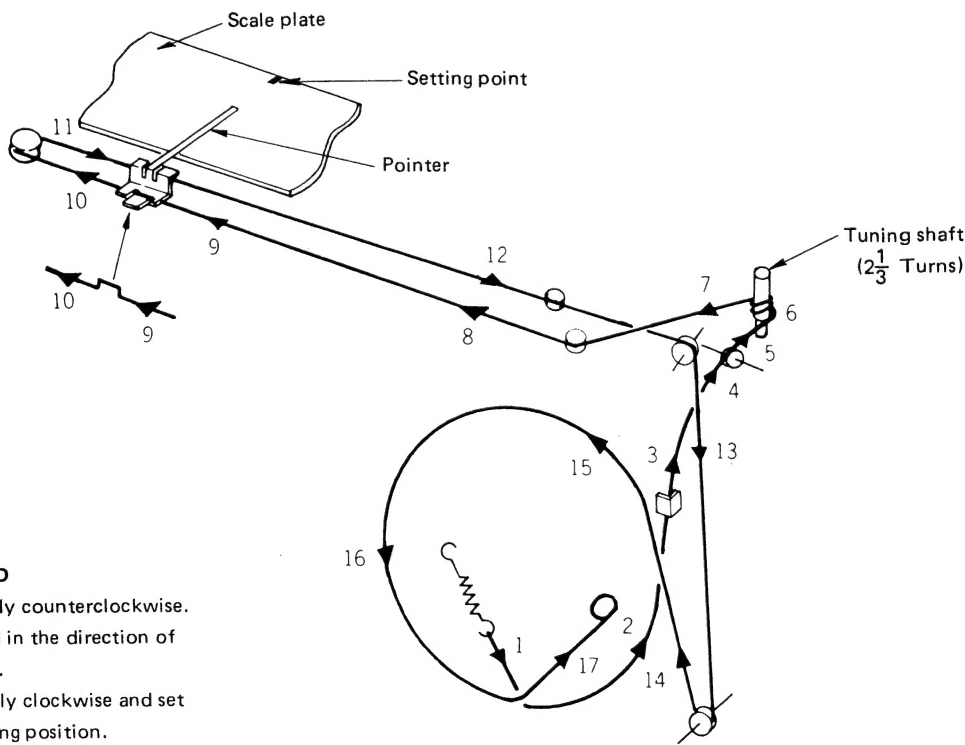
8. Mix P.C. board



10. Switch P.C. board



DIAL CORD STRINGING



STRINGING METHOD

- 1. Turn the pulley fully counterclockwise.
- 2. String the dial cord in the direction of arrow (No. 1-17).
- 3. Turn the pulley fully clockwise and set the pointer to setting position.

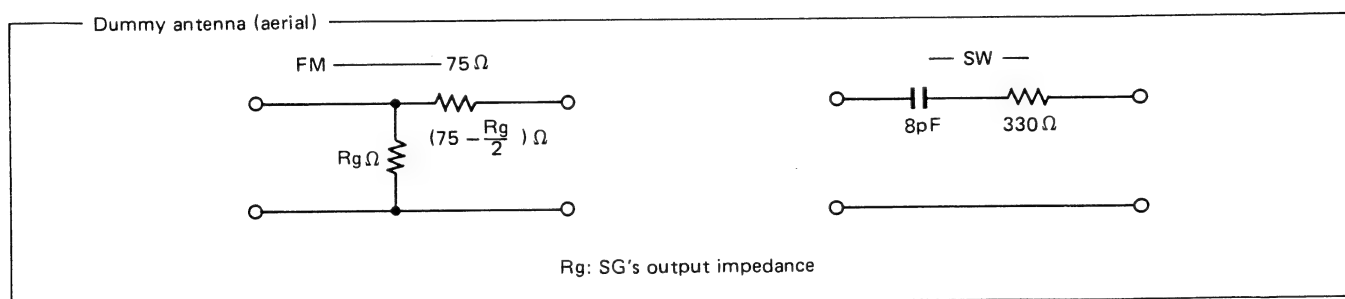
LUBRICATION

Lubricate one or two drops of machine oil to rotating point or lubricate grease to sliding point. Lubricate the respective parts listed below once every 1000 hours or once a year under normal conditions of use. Avoid oiling them excessively, or rotation may become irregular because of oil splashes.

Lubrication	Oil or grease
Motor shaft bearing	Oil
Capstan shaft bearing	
Pressure roller bearing	

ADJUSTMENT

TUNER SECTION

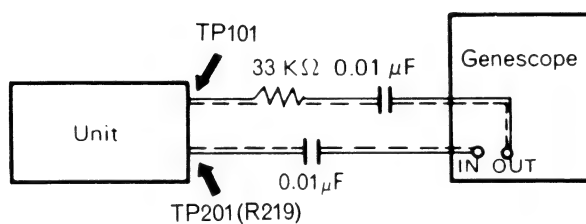


1. FM IF adjustment

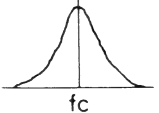
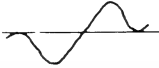
Setting :

- Function selector : Radio
- Mode switch : Mono
- Band selector : FM

Connection :



Adjustment :

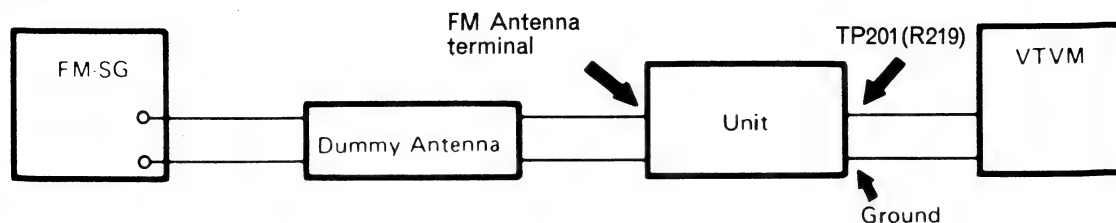
Genescope	Dial pointer position	Adjust	Reading	Remarks
10.7 MHz	Highest	T202	—	Turn T202 fully counterclockwise.
		T101 T201	Maximum 	1) f_c : Specified center frequency of the ceramic filter. 2) Reduce the level of the genescope to make one waveform.
		T202		Adjust T202 for a symmetrical sinewave (S curve) output.

2. FM RF (Covering & Tracking) adjustment

Setting :

- Function selector : Radio
- Mode switch : Mono
- Band selector : FM

Connection :



Adjustment :

Item		Signal generator		Dial pointer position	Adjust	Reading	Remarks
		Frequency	Modulation				
1	Covering	87.25 MHz ✳ 87.5 MHz	400 Hz 30%	Lowest	L103	Max.	_____
2		109 MHz		Highest	CT102		
3	Repeat 1 and 2.						
4	Tracking	90 MHz	400 Hz 30%	90 MHz	L101	Max.	
5		106 MHz		106 MHz	CT101		
6	Repeat 4 and 5.						

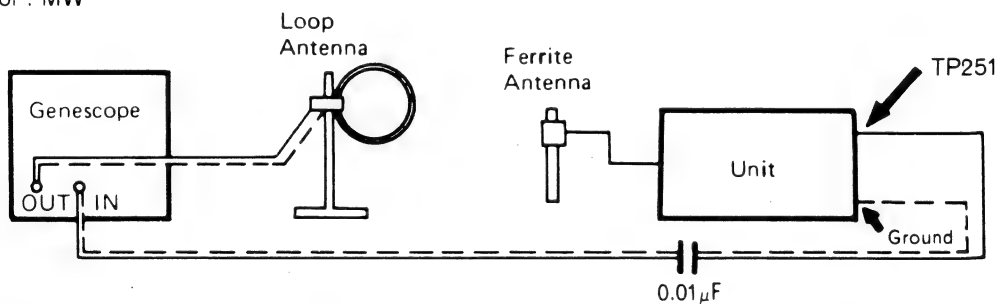
※ For West Germany

3. AM IF adjustment

Setting :

- Function selector : Radio
- Band selector : MW

Connection :



Adjustment :

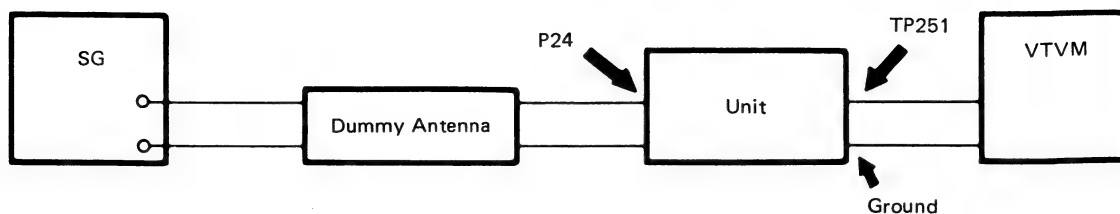
Genescope		Dial pointer position	Adjust	Reading	Remarks
Frequency	Modulation				
465 kHz	—	Highest	T151, T152 T204	Max.	—

4. SW RF (Covering & Tracking) adjustment

Setting:

- Function selector: Radio
- Band selector: FM

Connection :



Adjustment :

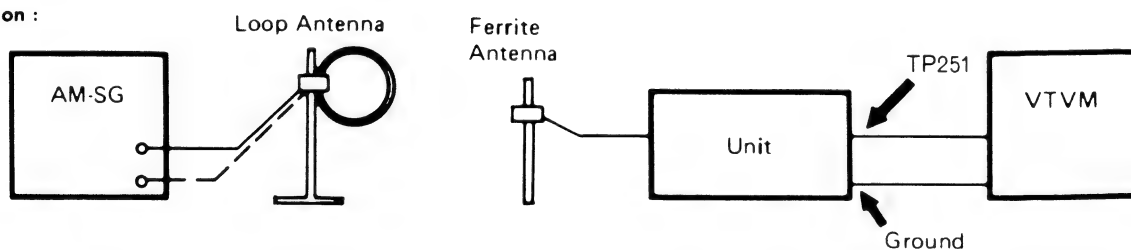
Item		Signal generator		Dial pointer position	Adjust	Reading	Remarks
		Frequency	Modulation				
1	Covering	5.8 MHz	400 Hz 30%	Lowest	L154	Max.	—
2		18.5 MHz		Highest	CT154		
3	Repeat 1 and 2.						
4	Tracking	6.5 MHz	400 Hz 30%	6.5 MHz	L151	Max.	
5		16 MHz		16 MHz	CT151		
6	Repeat 4 and 5.						

5. MW/LW RF (Covering & Tracking) adjustment

Setting:

- Function selector: Radio
- Band selector: MW or LW

Connection :



Adjustment :

1) MW

Item		Signal generator		Dial pointer position	Adjust	Reading	Remarks
		Frequency	Modulation				
1	Covering	515 kHz	400 Hz 30%	Lowest	L155	Max.	_____
2		1650 kHz		Highest	CT155		
3	Repeat 1 and 2.						
4	Tracking	600 kHz	400 Hz 30%	600 kHz	L152	Max.	
5		1400 kHz		1400 kHz	CT152		
6	Repeat 4 and 5.						

2) LW

Item		Signal generator		Dial pointer position	Adjust	Reading	Remarks
		Frequency	Modulation				
1	Covering	145 kHz	400 Hz 30%	Lowest	L156	Max.	—
2		360 kHz		Highest	CT156		
3	Repeat 1 and 2.						
4	Tracking	160 kHz	400 Hz 30%	160 kHz	L153	Max.	
5		330 kHz		330 kHz	CT153		
6	Repeat 4 and 5.						

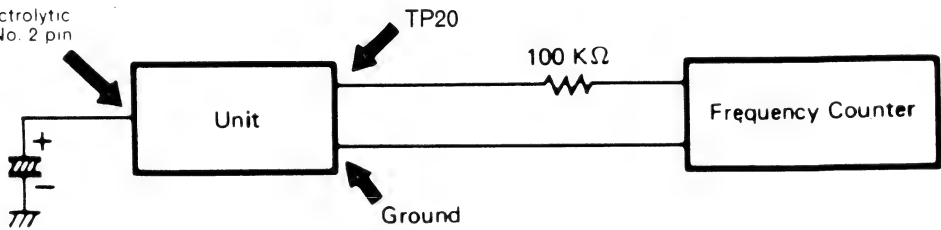
5. FM MPX (Multiplex) adjustment

Setting :

- Function selector : Radio
- Band selector : FM
- Mode switch : stereo

Connection :

Connect a 10 μ F 25V electrolytic capacitor between the No. 2 pin of IC301 and ground.



Adjustment :

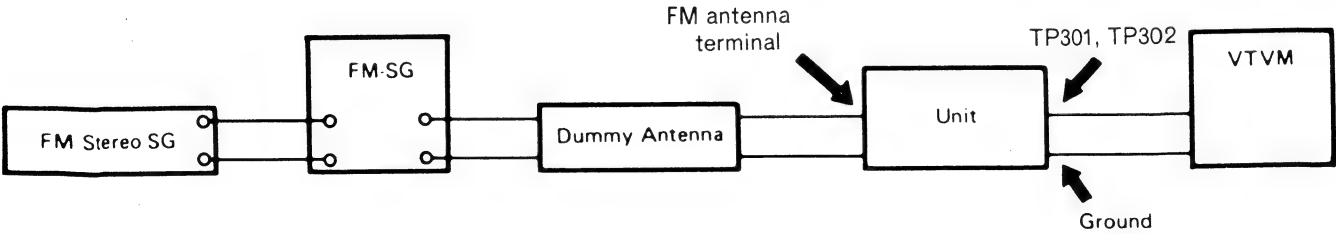
Adjust	Reading	Remarks
RT302	19 kHz \pm 100 Hz	-

6. FM separation adjustment

Setting :

- Function selector : Radio
- Band selector : FM
- Mode switch : Stereo

Connection :



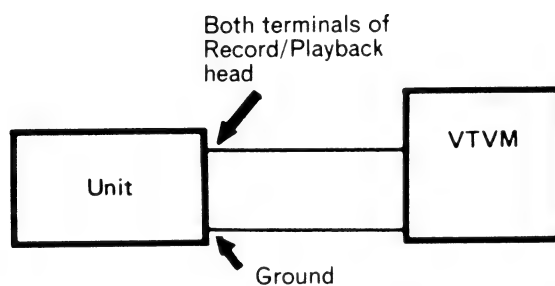
Adjustment :

Signal generator		Dial pointer position	Adjust	Reading	Remarks
Frequency	Modulation				
98 MHz 60 dB	L + R (1 kHz) : 40 kHz dev. Pilot (19 kHz) : 6 kHz dev.	98 MHz	RT301	Min.	1) After feeding in of R channel and pilot signals, adjust RT301 for a minimum L channel output. 2) Optimize RT301 so that the leak level of the L channel signal is equal to that of the R channel signal.

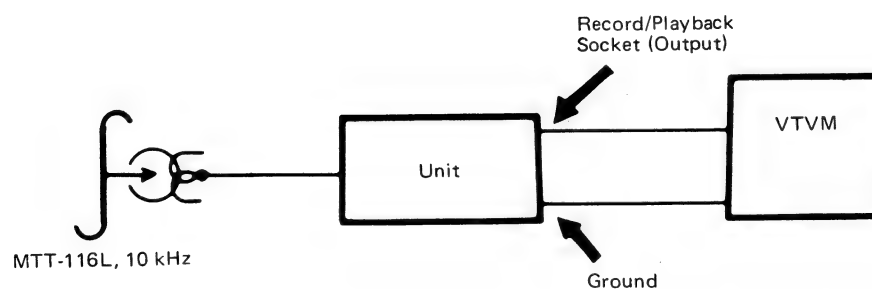
TAPE DECK SECTION**1. Bias current adjustment****Setting :** Recording mode

● Tape selector : NORMAL

● RIF switch : A position

Connection :

Adjustment : Set the record mode. Adjust RT401R (RT-401L) so that the bias voltage of 7.5V is applied to the both terminals of Record/Playback head.

2. Head azimuth adjustment**Setting :** Playback mode**Connection :**

Adjustment : Playback a test tape (MTT-116L, 10 kHz) and adjust the azimuth adjustment screw for maximum output.

3. Installation position of solenoid

Adjust the solenoid installation position so that gaps between the solenoid and lockarm, $a = 0$ (close contact), $b = 0 - 0.5$ mm when the solenoid fixing screw shown in Fig. 11 is loosened and power is supplied to operate the solenoid. After adjusting it, leave the solenoid operating, move the solenoid holder in the direction of the arrow, slide the lock plate which locks the DRPS operation slider fully, check that gaps $a = 0$, $b = 0 \sim 0.5$ mm and fix the solenoid holder. Check that there is no reduction in lock plate movement and the stroke at this time.

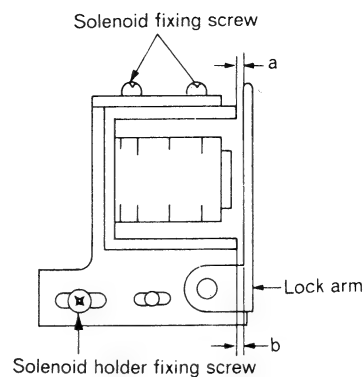


Fig. 11

4. Installation position of DRPS switch

Install the DRPS switch so that when the unit stops, the switch plate and the DRPS switch the gap between becomes approx. 0.1~0.5mm as shown in Fig. 12.

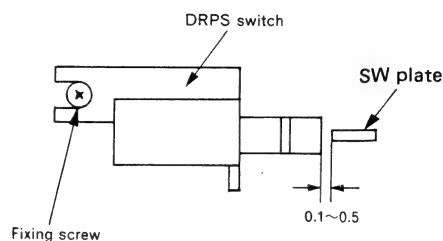


Fig. 12

5. Installation position of the AS releasing plate

Install the AS releasing plate so that gaps a & b of the engaging section of the AS operation plate and AS releasing plate shown in Fig. 13 are equal. Check that the AS cam gear and AS gear shown in Fig. 14 engage more than $1/2$, when the solenoid is operated after installation.

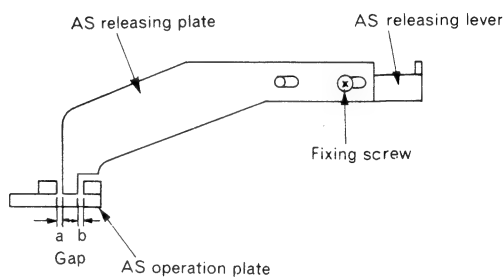


Fig. 13

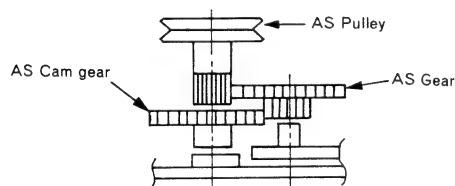


Fig. 14

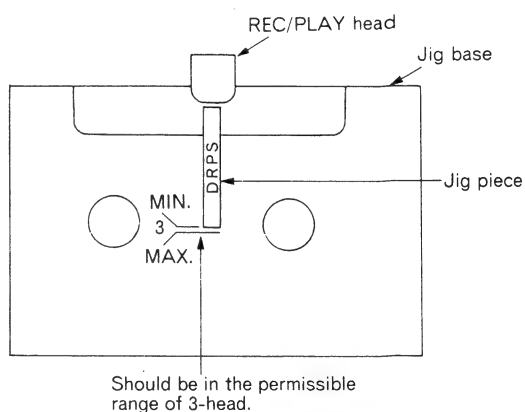
6. Projection of REC/PLAY head during DRPS operation

Mount the jig, press the DRPS button on the FF or REW button side in the PLAY mode and check the projection of the REC head by the same procedure as in the conventional REC/PLAY head projection check during PLAY. Use the jig piece exclusively for D.R.P.S and the dimension of the marking-off line of the jig base, within the permissible range (within 0.4 mm) for 3 heads.

Reference: REC/PLAY head projection within the permissible 3-head range using the exclusively jig piece is 1.7~2.1 mm.

Adjust projection by the following procedure when it is not in the above range. First perform adjustment specified in (1). When projection cannot be adjusted in this range, perform adjustments specified in (2) and (3).

- (1) Adjustment to max. 0.2 mm is possible by adjusting the forward and backward position of the head.



Should be in the permissible range of 3-head.

Fig. 15

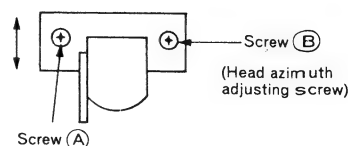


Fig. 16

INSPECTION

(2) Adjustment to max. 0.2 mm is possible by changing the installation position of the DRPS mechanism assembly.

(3) The REC/PLAY projection becomes larger during DRPS operation by moving the DRPS mechanism ass'y in the direction A.

Be sure to perform the checking and adjustment mentioned above during replacement of parts or repairs. Especially, when checking the mechanism, the DRPS mechanism is often removed. The projection of the REC/PLAY head changes when the DRPS is removed, so check the projection of the REC/PLAY head after reassembly.

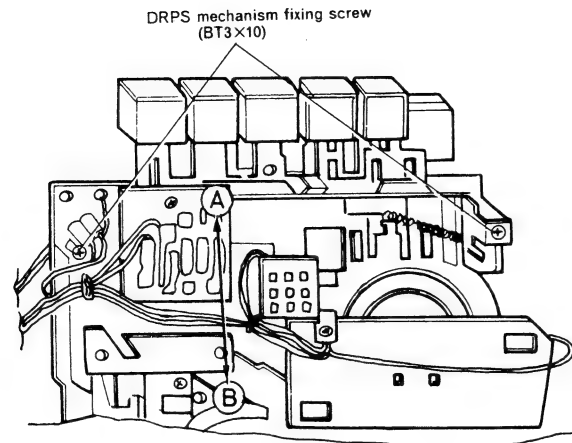


Fig. 17

7. Adjustment of the input level during DRPS operation

Load the test tape TMT-6261 (for level adjustment), press the DRPS button on FF side in the PLAY mode to operate the DRPS function. Connect the voltmeter between the test point terminal P19 (terminal 6 of IC701) and ground. Adjust so that when the 500 Hz, -40 dB section of the test tape TMT-6261 is fast-forwarded in the DRPS mode and RT701 is turned from max. counterclockwise (output voltage at that time is Hi (6.5V) clockwise, the output voltage is just after it changes to Lo (0V).

Ideally, adjust RT701 to the position just after the Hi potential change to Lo potential. When RT701 is turned further clockwise, the input level decreases and the unit is likely to top at other than inter-tune section.

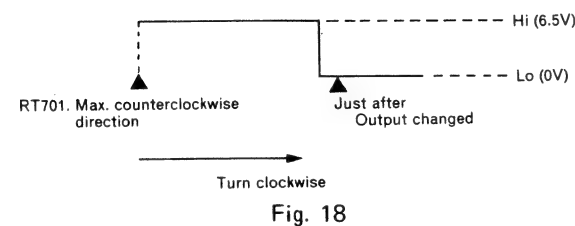


Fig. 18

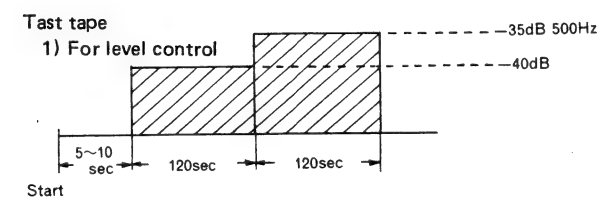


Fig. 19

2) For Stop/Non-stop control

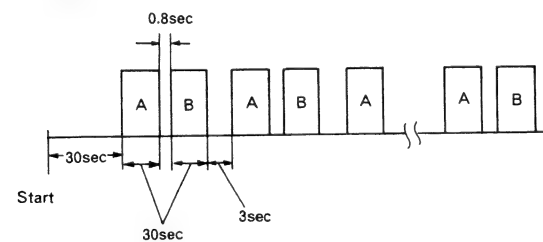


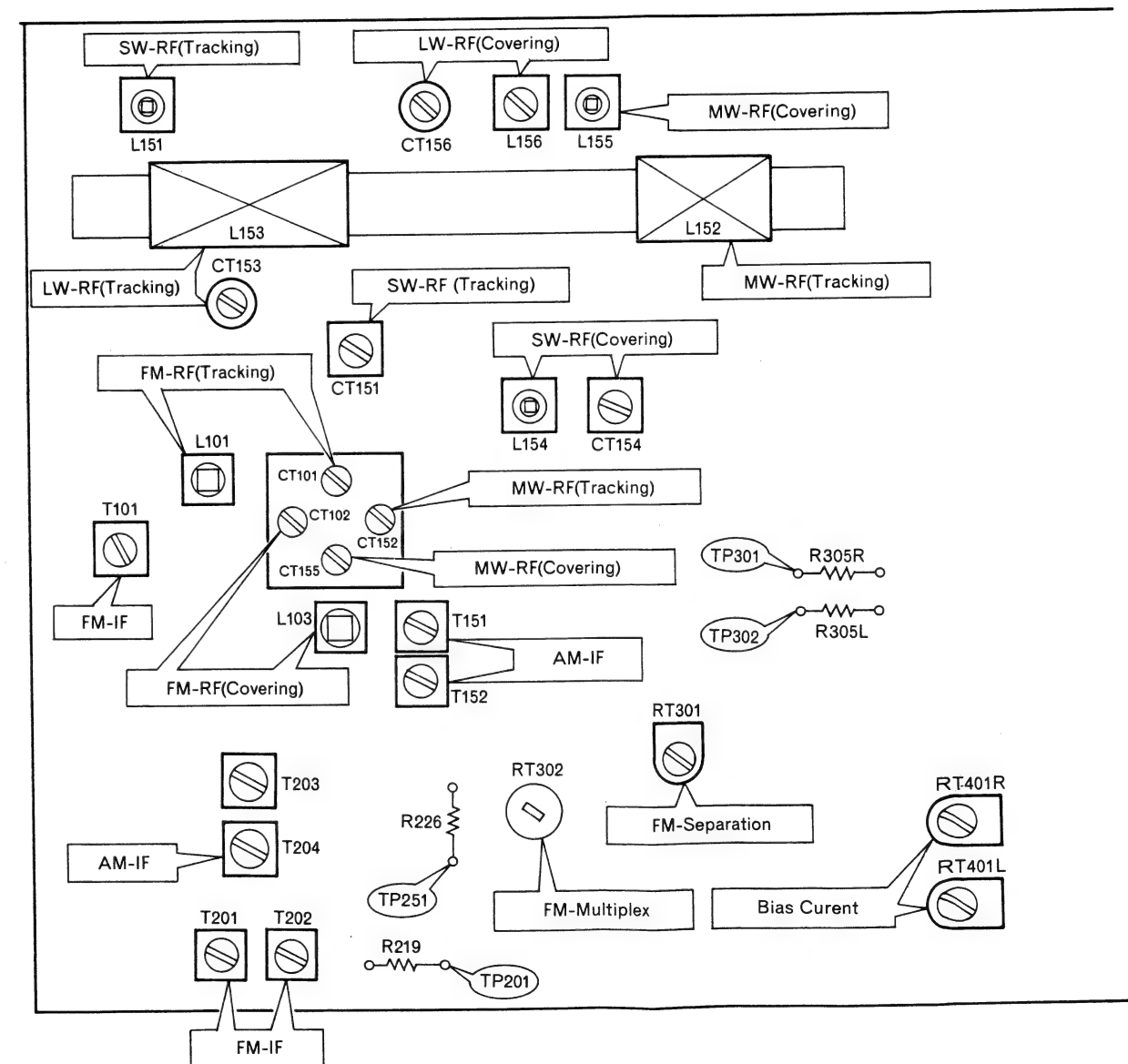
Fig. 20

8. Checking STOP mode

Mount the test tape TMT-6262 (for checking STOP/NON-STOP), press the PLAY button and DRPS button on the FF side simultaneously while the tape is wound fully in the REW direction. Check that the tape does not stop at the 0.8 sec. non-signal section (a line is drawn at the 0.8 sec. non-signal section. 1 kHz signal is recorded in the section before the 0.8 sec non-signal section and a 500 Hz signal is recorded 0.8 sec after the non-signal section, so check that the tape does not stop at the point where the frequency changes) and stops at the next 3 sec. non-signal section. The 0.8 sec. and 3 sec non-signal sections are present at 9 positions with equal intervals, so checking is possible 9 times continuously. Also, set the DRPS program to "9" to check that the tape stops at the indication "0".

Mode	Item	Pressure or Torque
Playback	Pressure of pressure roller	350g ~ 500g
	Take-up torque	35g-cm ~ 60g-cm
	Supply reel back tension	1.5g-cm ~ 3.5g-cm
Rewind	Rewind torque	60g-cm ~ 90g-cm
Fast Forward	Fast Forward torque	65g-cm ~ 90g-cm

Adjustment Parts Location



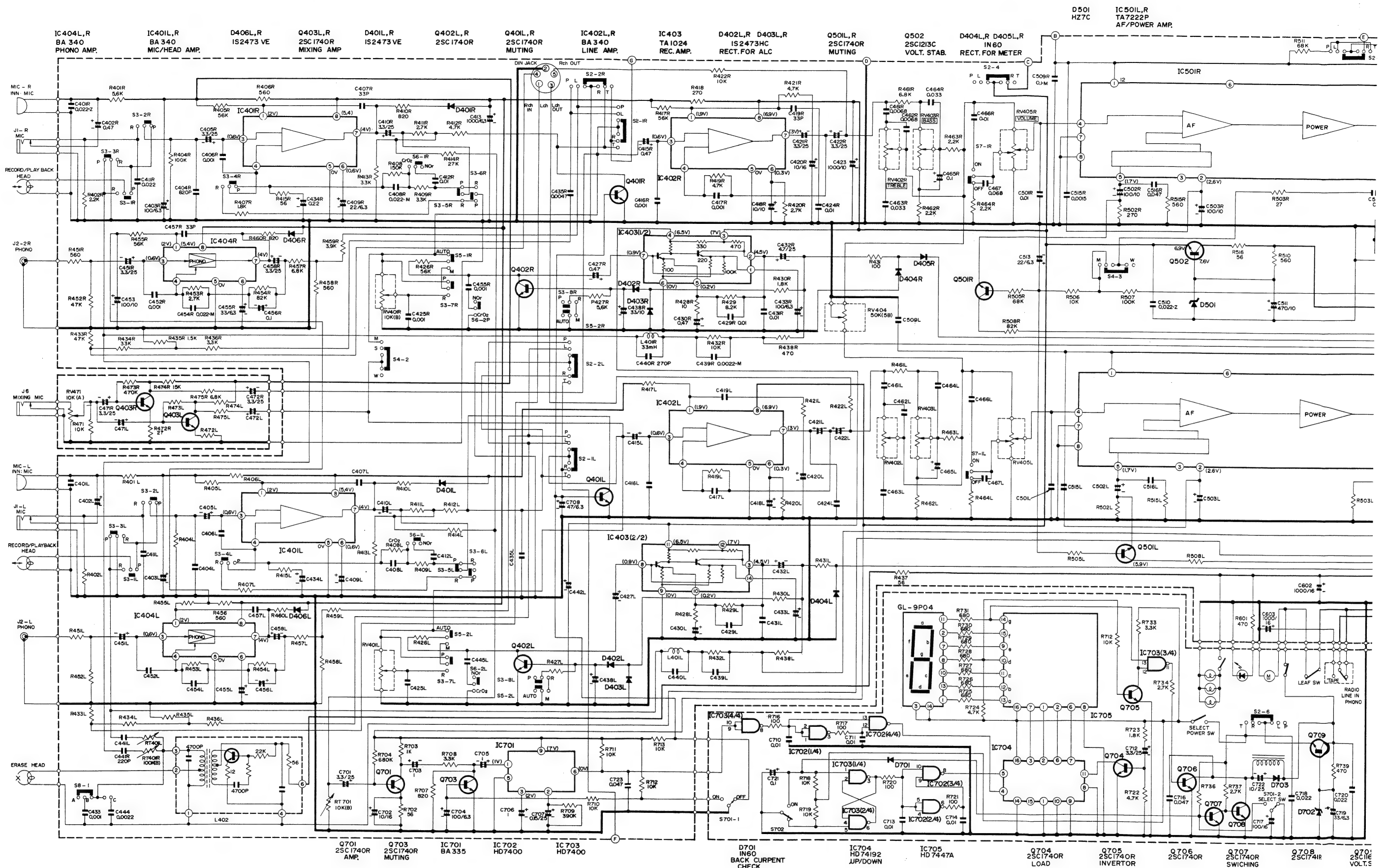
COMPONENT DESIGNATIONS AND VALUES:

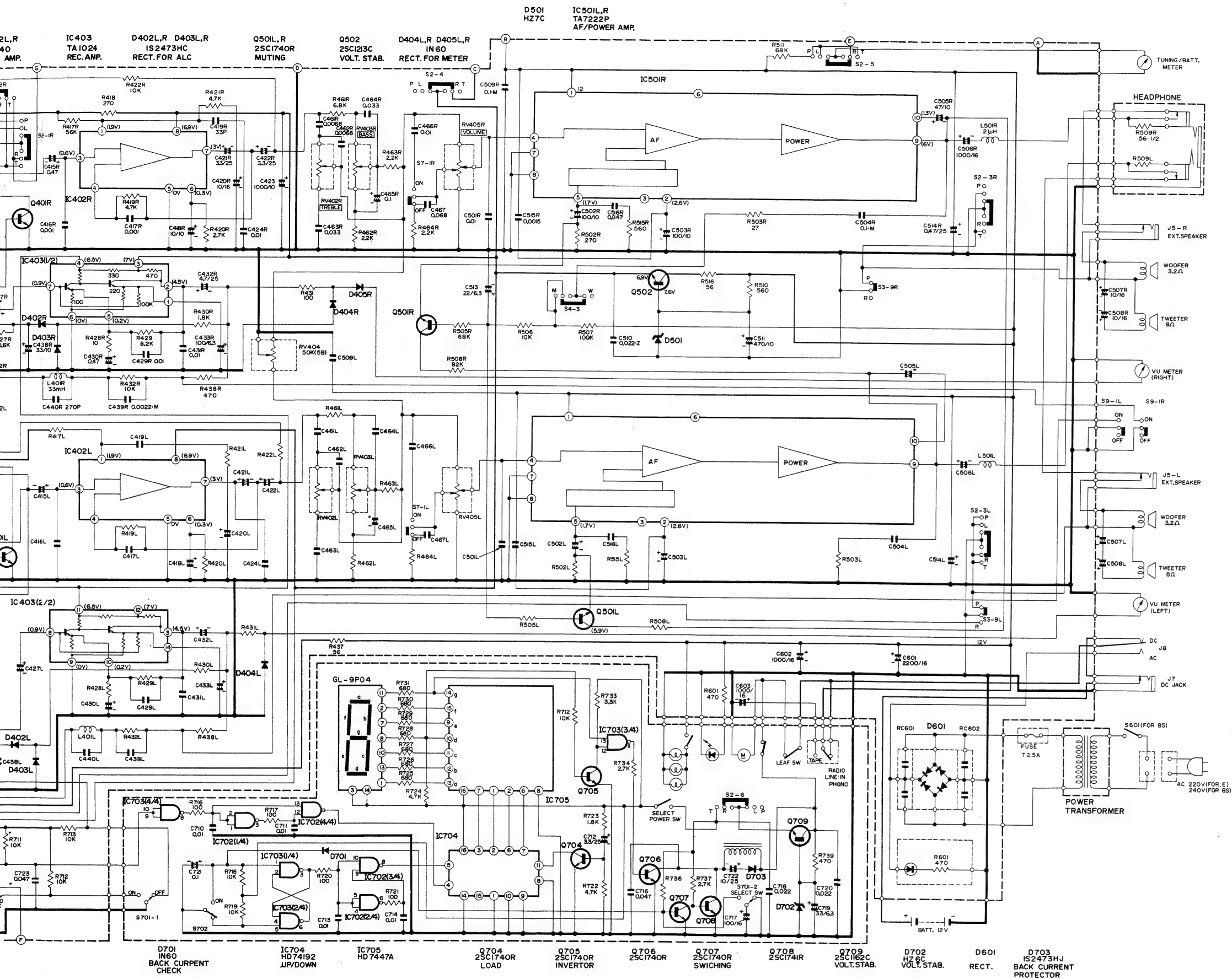
Designation	Value
D101	IS2473HC COMPENSATION FM RF AMP
Q101	2SC1674 FM RF AMP
D104	IS2790 FM AFC
D102	IS2473HJ FM LIMITER
Q102	2SC1674 FM CONV.
Q103	2SC1675 FM OSC.
D103	IS2473HC FM LIMITER
Q201	2SC1675 FM IF AMP
IC201	AN253 FM/AM IF AMP
D203	IN60 RECT.FORMETER
D204	IN60 AM DET.
D205	IN60 RECT.FORMETER
D206	IN60 RECT.FORMETER
D201	IN60 FM DISCRI.
D202	IN60 FM DISCRI.

COMPONENT FOOTPRINTS AND VALUES:

Footprint	Value
Q151	2SC1674 AM CONV.
Q152	2SC1675 AM OSC.
D151	IN60 AM AGL
IC301	BA1320 FM MPX.
D301	FM STEREO INDICATOR

SCHEMATIC DIAGRAM (TAPE RECORDER/AF/POWER SECTION)





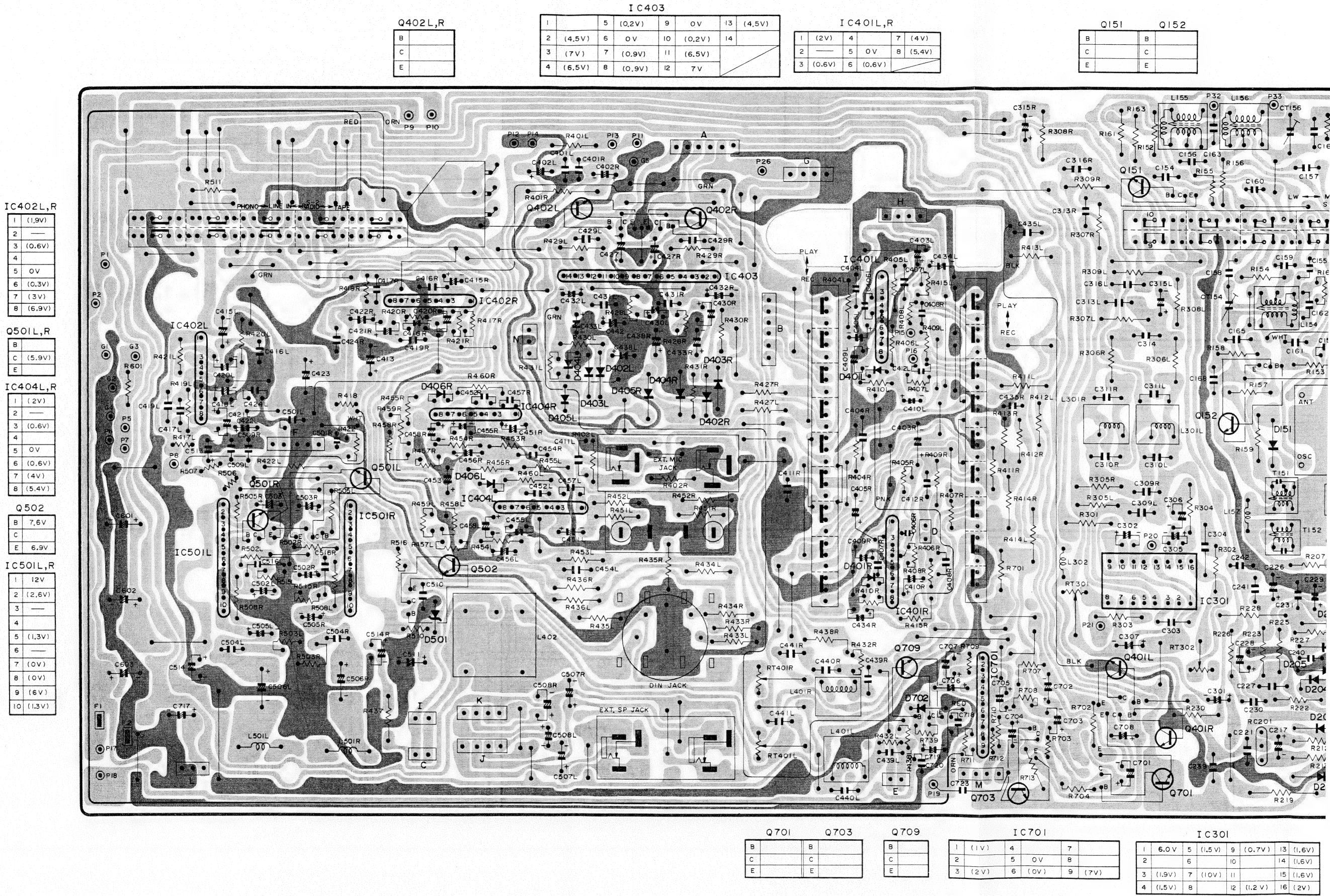
Note

1. Voltage measured at base of chassis with minimum volume control and no signal.
2. Nomenclature of Resistors and Capacitors.

Circuit No.	
Value	No indicated Ω (Ohm) M : 1000 k Ω
Tolerance	No indicated $\pm 5\%$ K : $\pm 10\%$ M : $\pm 20\%$
Wattage	No indicated $\frac{1}{4}W$
Sort	No indicated Carbon film RC : Composition RW : Wire wound RS : Oxide metal film RN : Fixed metal film

Circuit No.	
Value	No indicated μF P : PF
Tolerance	No indicated $\pm 10\%$ J : $\pm 5\%$ M : $\pm 20\%$ Z : $+80\%$ - 20% D : $\pm 0.5pF$ C : $\pm 0.25pF$
Sort	Ceramic Electrolytic Mylar Polyester Styrol
Voltage	No indicated 50WV

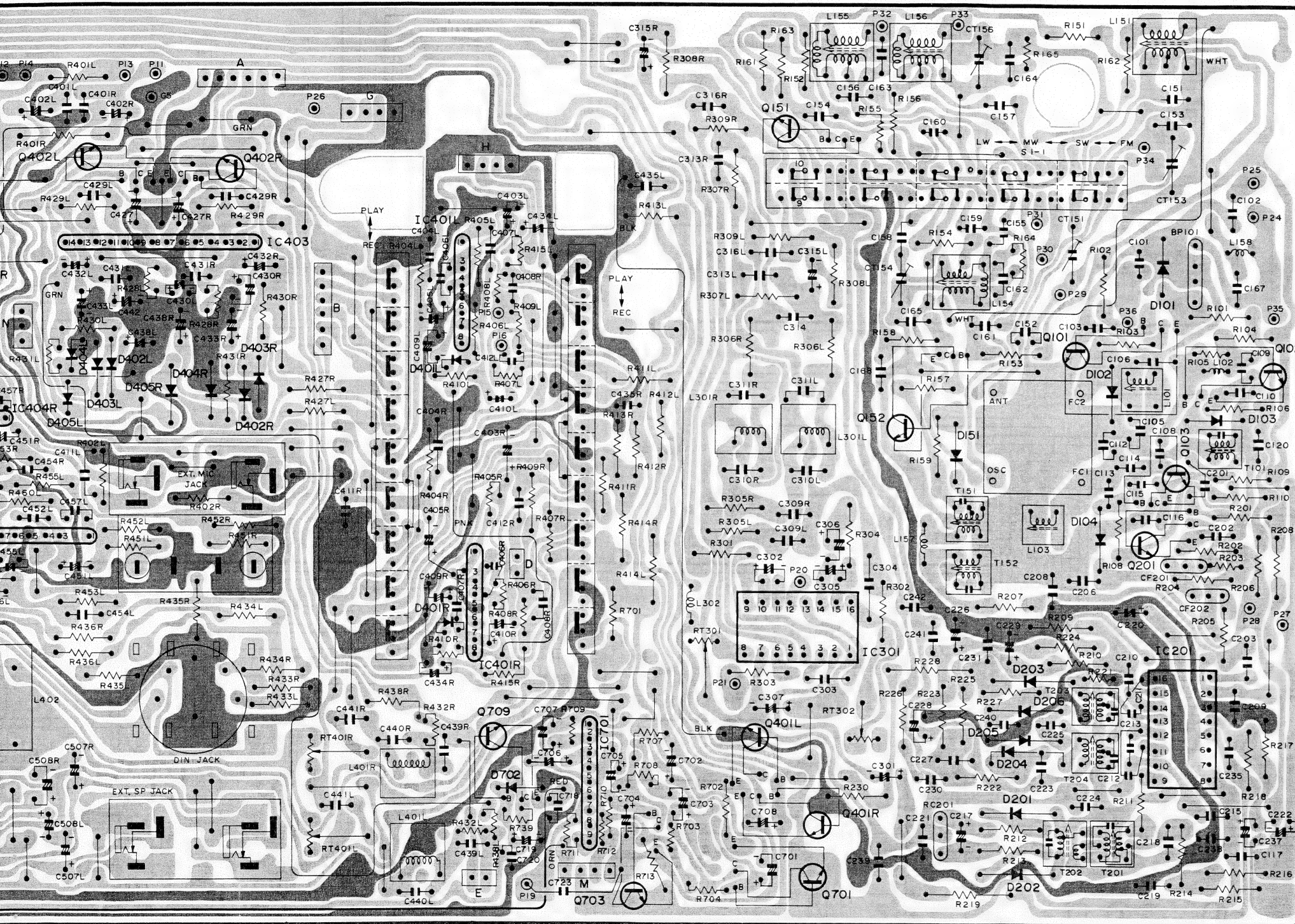
3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.
4. When replacing capacitors marked with *, use specified ones stated on parts list since required temperature characteristics.



IC403				
1		5 (0.2V)	9 0V	13 (4.5V)
2 (4.5V)	6 0V	10 (0.2V)	14	
3 (7V)	7 (0.9V)	11 (6.5V)		
4 (6.5V)	8 (0.9V)	12 7V		

IC401L,R				
1 (2V)	4	7 (4V)		
2	5 0V	8 (5.4V)		
3 (0.6V)	6 (0.6V)			

Q151 Q152				
B		B		
C		C		
E		E		



Q101				
B	(1.6V)			
C	(5.6V)			
E	(0.8V)			

Q102				
B	(1.6V)			
C	(5.9V)			
E	(0.8V)			

Q103				
B	(1.5V)			
C	(5.6V)			
E	(0.8V)			

Q201				
B	(1.6V)			
C	(5.9V)			
E	(0.8V)			

IC201				
1	0.7V			
2	1.6V			
3	0V			
4	1.4V			
5	1.8V			
6				
7				
8				
9				
10				
11	0.7V			
12				
13				
14	0.7V			
15	0.4V			
16	0V			

Q701 Q703				
B		B		
C		C		
E		E		

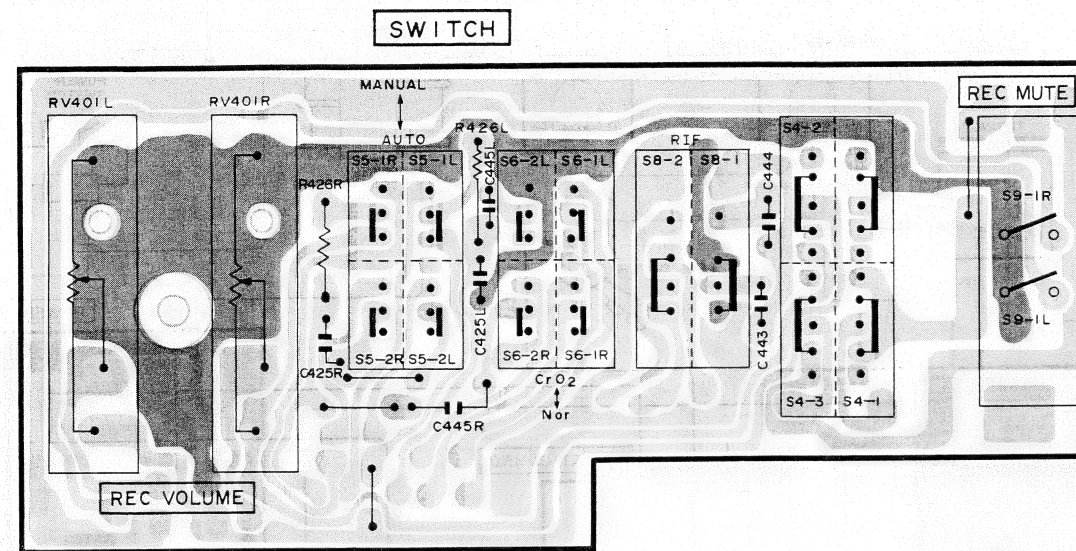
Q709				
B		B		
C		C		
E		E		

IC701				
1 (1V)	4	7		
2	5 0V	8		
3 (2V)	6 (0V)	9 (7V)		

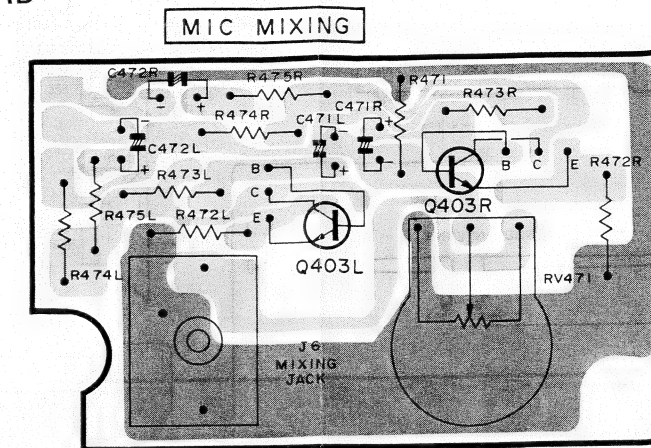
IC301				
1 6.0V	5 (1.5V)	9 (0.7V)	13 (1.6V)	
2	6	10	14 (1.6V)	
3 (1.9V)	7 (1.0V)	11	15 (1.6V)	
4 (1.5V)	8	12 (1.2V)	16 (2V)	

Q401L,R				
B		B		
C		C		
E		E		

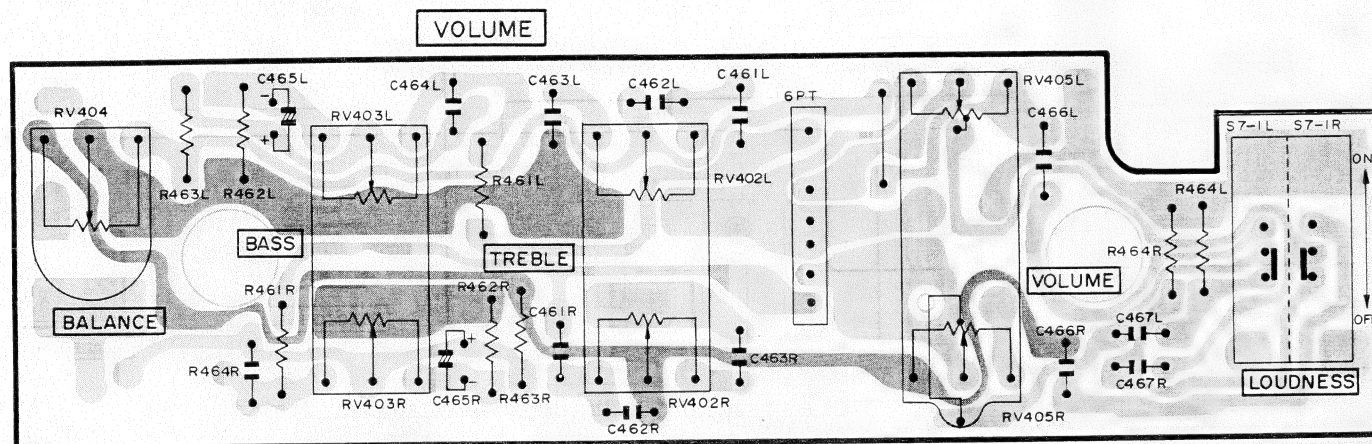
SWITCH PC BOARD



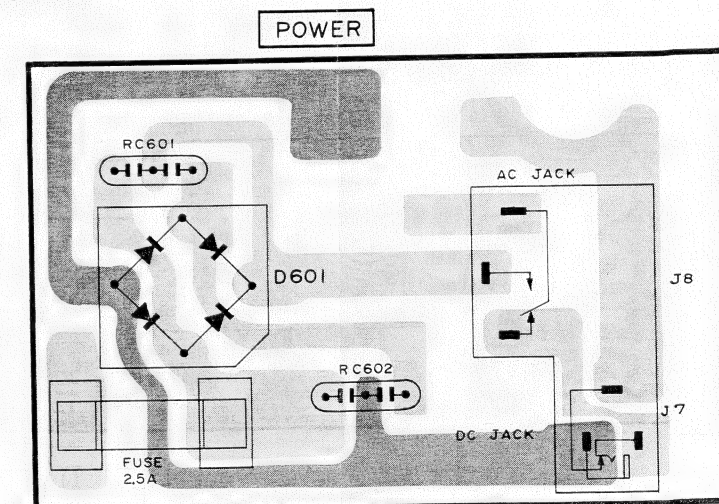
MIX PC BOARD



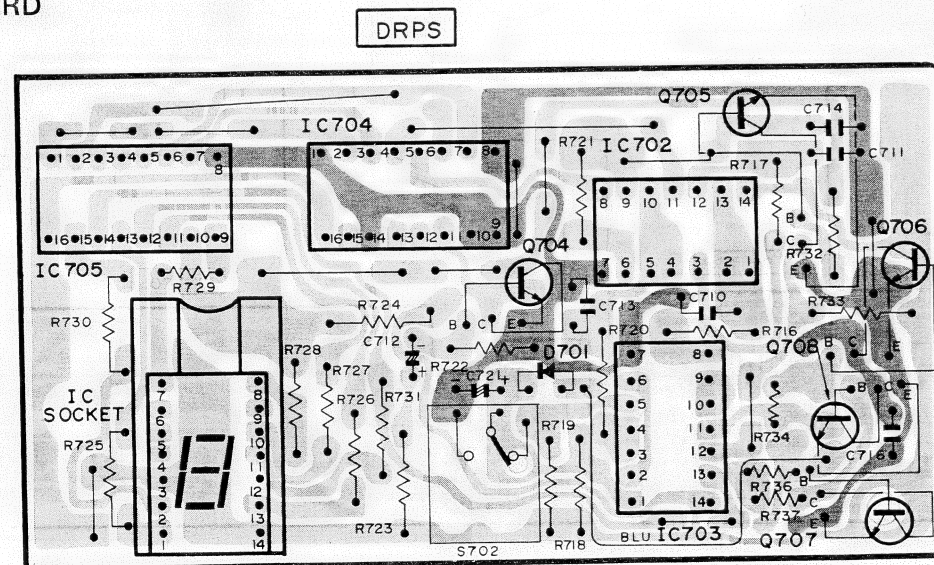
VOLUME PC BOARD



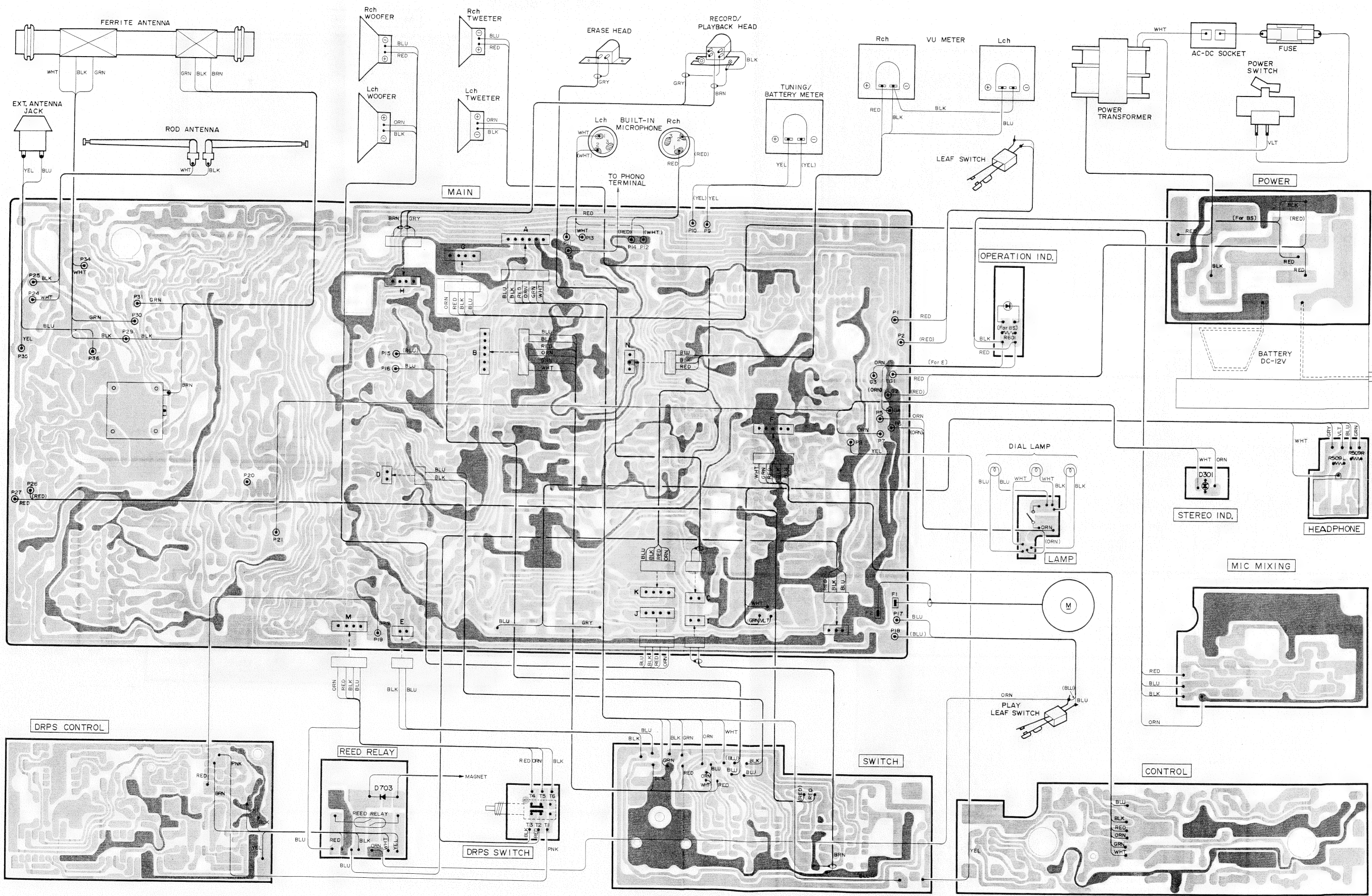
POWER PC BOARD



DRPS PC BOARD



WIRING DIAGRAM

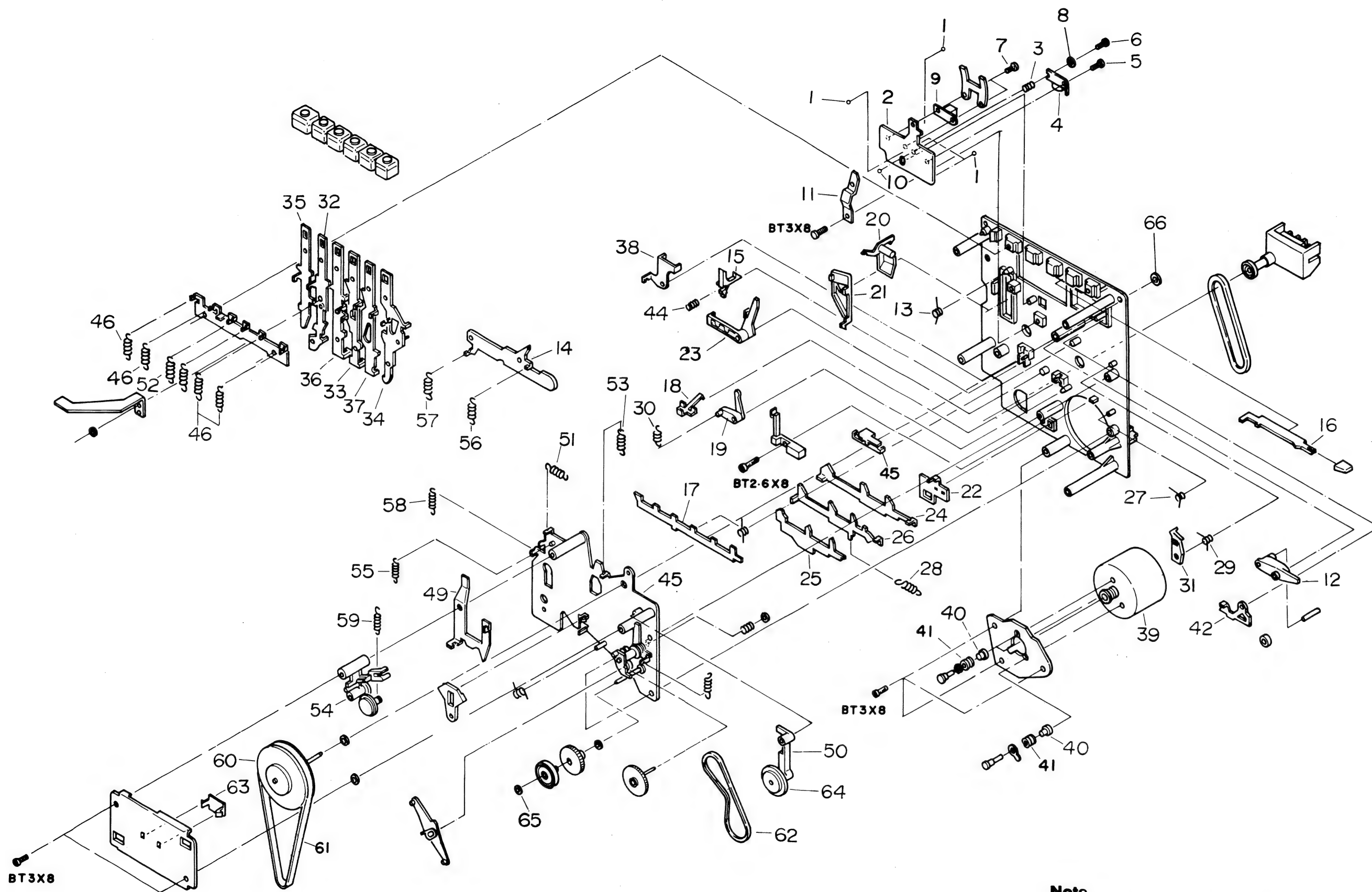


REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS			D406LR	5330571	DIODE 1S2473VE
CT101	5052191	PLASTIC FILM VARIABLE	D501	5330313	DIODE 1.0M SILICON HZ7C
CT102	5052191	PLASTIC FILM VARIABLE	D701	0575005	DIODE 80M GERMANIUM 1N60
CT151	5058191	TRIMMER 10PF	D702	5330393	ZENER DIODE SILICON HZ6C 1MHZ
CT152	5052191	PLASTIC FILM VARIABLE	D703	5330574	DIODE 1S2473
CT153	5058102	VARIABLE	IC201	5351064	IC AN2538B
CT154	5058191	TRIMMER 10PF	IC301	5350682	IC BA 1320
CT155	5052191	PLASTIC FILM VARIABLE	IC401LR	5350961	IC BA340
CT156	5058102	VARIABLE	IC402LR	5350961	IC BA340
CV101	5052191	PLASTIC FILM VARIABLE	IC403	5357001	IC TA1024
CV102	5052191	PLASTIC FILM VARIABLE	IC404LR	5350961	IC BA340
CV151	5052191	PLASTIC FILM VARIABLE	IC501LR	5350811	IC TA7222P
CV152	5052191	PLASTIC FILM VARIABLE	IC701	5352033	IC BA335
C112	0248158	CERAMIC DISCAL 8PF+-0.5%	IC702	5359431	IC HD7400P
C114	0246474	CERAMIC DISC 15PF+-10%(NP-0)	IC703	5359431	IC HD7400P
C115	0246443	CERAMIC 13PF+-5% DC500WV	IC704	5359791	IC HD74192
C116	0246474	CERAMIC DISC 15PF+-10%(NP-0)	IC705	5359801	IC HD7447A
C304	0249537	CERAMIC DISC 470PF+-5%(NP-0)	LED001	5380101	RADIATION DIODE SLP-24B
RESISTORS			LED002	5380271	LED GL-9PR2
RC201	0186357	CR PACK	Q101	5321271	TRANSISTOR SILICON 2SC1674L 600MHZ
RC601	0186451	CR PACK	Q102	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
RC602	0186451	CR PACK	Q103	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
RT301	0151806	SEMI VARIABLE 1KOHM B	Q151	5321271	TRANSISTOR SILICON 2SC1674L 600MHZ
RT302	5007186	SEMI VARIABLE 10KOHM	Q152	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
RT401LR	0151818	VARIABLE 100KOHM	Q201	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
RT701	0151808	SEMI VARIABLE 10K OHM R588	Q401LR	5321293	TRANSISTOR 2SC1740LN-R
RV401LR	5027002	VARIABLE 10KOHM(B)	Q402LR	5321293	TRANSISTOR 2SC1740LN-R
RV402	5000491	VARIABLE 100KOHM(B)	Q403LR	5321293	TRANSISTOR 2SC1740LN-R
RV403	5000492	VARIABLE 100KOHM(C)	Q501LR	5321293	TRANSISTOR 2SC1740LN-R
RV404	5000139	VARIABLE 50KOHM(B)	Q502	5320613	TRANSISTOR SILICON 2SC1213C 80M
RV405	5000493	VARIABLE 10KOHM(R)	Q701	5321293	TRANSISTOR 2SC1740LN-R
RV471	5000401	VARIABLE 10KOHM(A)	Q703	5321293	TRANSISTOR 2SC1740LN-R
SEMI-CONDUCTORS			Q704	5321293	TRANSISTOR 2SC1740LN-R
DB601	5331101	DIODE M4B-31	Q705	5321293	TRANSISTOR 2SC1740LN-R
D101	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q706	5322213	TRANSISTOR 2SC1741R
D102	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q707	5321293	TRANSISTOR 2SC1740LN-R
D103	5330574	DIODE 1S2473	Q708	5322213	TRANSISTOR 2SC1741R
D104	5330661	DIODE SILICON LS2790 200MHZ 80MW	Q709	5320643	TRANSISTOR SILICON 2SC1162 150M
D151	5330732	DIODE GERMANIUM 1N60P 80MHZ 50MW	TRANSFORMERS		
D201-206	5330732	DIODE GERMANIUM 1N60P 80MHZ 50MW	T101	5140071	FM IFT
D401LR	5330571	DIODE 1S2473VE	T151	5130153	AM IF
D402L	5330574	DIODE 1S2473	T152	5130121	AM IFT
D402R	5330573	DIODE SILICON 1S2473 300MHZ 300MW	T201	5148111	FM DISCRIMINATOR
D403LR	5330574	DIODE 1S2473			
D404LR	0575005	DIODE GERMANIUM 1N60 80M			
D405LR	0575005	DIODE GERMANIUM 1N60 80M			

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
TRANSFORMERS			PL1	5762283	LAMP(12V)
T202	5148112	FM DISCRIMINATOR	PL2	5762281	LAMP
T203	5140072	FM IFT	PL3	5762286	LAMP(12V)
T204	5130122	AM IFT	S 1	5625011	SLIDE SWITCH
T601	5212682	POWER	S 2	5624151	SLIDE SWITCH
T601	5212683	POWER (BS)	S 3LR	5623431	SLIDE SWITCH
COILS			S 4	5604281	LEVER SEITCH
L101	5126482	FM RF	S 5LR	5604103	LEVER SWITCH
L102	5150791	CHOKE	S 6LR	5604103	LEVER SWITCH
L103	5126313	FM OSCILLATOR	S 7LR	5604082	LEVER SWITCH
L106	0333121	TRAP	S 8	5604092	LEVER SWITCH
L151	5123493	SWITCH ANTENNA	S 9LR	5633491	PUSH SWITCH
L152	5113271	FERRITE ANTENNA	SP	5401121	SPEAKER-5CM
L153	5113271	FERRITE ANTENNA	SP	5407331	SPEAKER-16CM
L154	5123494	SW OSC	S601	5602021	SEESAW SWITCH (BS)
L155	5120319	OSCILLATOR	S701	5633315	PUSH SWITCH
L156	5120465	LW OSC	S702	5633531	PUSH SWITCH
L157	5152091	CHOKE 180MICRO H	S703	5641311	LEAD SWITCH
L158	5150791	CHOKE	S704	5603231	LEAF SWITCH
L301LR	5150571	CHOKE 33MH	S705	5603112	LEAF SWITCH
L302	5152091	CHOKE 180MICRO H	FOR ACCESSARIES		
L401LR	5120306	TRAP	△	5747321	POWER CORD
L402	5260661	OSCILLATOR BLOCK	△	5746341	CORD ASSEMBLY (BS)
L501LR	5150761	CHOKE		5894731	FM DIPOLE ANTENNA (BS)
MISCELLANEOUS			FOR CASSETTE DECK ASSEMBLY (A)		
△	5310351	DISPLAY GL9P04	1	0948492	BALL - 2MMD
	5643043	MAGNET	2	7105837	HEAD PLATE
	5653211	DIN JACK	3	6321734	SPRING
	5653241	AC-DC SOCKET	4	5444761	RECROD PLAYBACK HEAD
	5653321	IC SOCKET	5	7780912	TAPPING SCREW-2MMDX8MM
	5659121	BACK COVER	6	7781004	SCREW
	5671661	FM ANTENNA TERMINAL	7	7780912	TAPPING SCREW-2MMDX8MM
	5674132	HEADPHONE JACK	8	7778183	POLYESTER WASHER
ANT	5752371	ROD ANTENNA	9	5445131	ERASE HEAD
BP101	5161551	FILTER	10	0948492	BALL - 2MMD
CF201	5160211	CERAMIC FILTER CF107A	11	6329637	HEAD PLATE HOLDER
CF202	5160211	CERAMIC FILTER CF107A	12	6383142	PRESSURE ROLLER ARM ASSEMBLY
F001	5721064	FUSE 2.5A	13	6307741	SPRING
F601	5720173	FUSE 500MA (BS)	14	7286182	PR LEVER
J1LR	5679442	JACK PLATE (MIC,MONITOR)	15	6741103	RECORDING PREVENTION ARM
J2LR	5676163	2P PIN JACK	16	7286253	PR PLATE
J5LR	5679442	JACK PLATE (MIC,MONITOR)	17	7286145	LOCK PLATE
J6	5674161	JACK-6.4MMD	18	6530471	CASSETTE HOL DER
LM	5554433	LEVEL METER	19	6740971	BRAKE FUNCTI ON ARM
LM	5554721	LEVEL METER	20	6740982	EJECT ARM
MIC	5421211	MICROPHONE	21	6741186	EJECT SLIDER

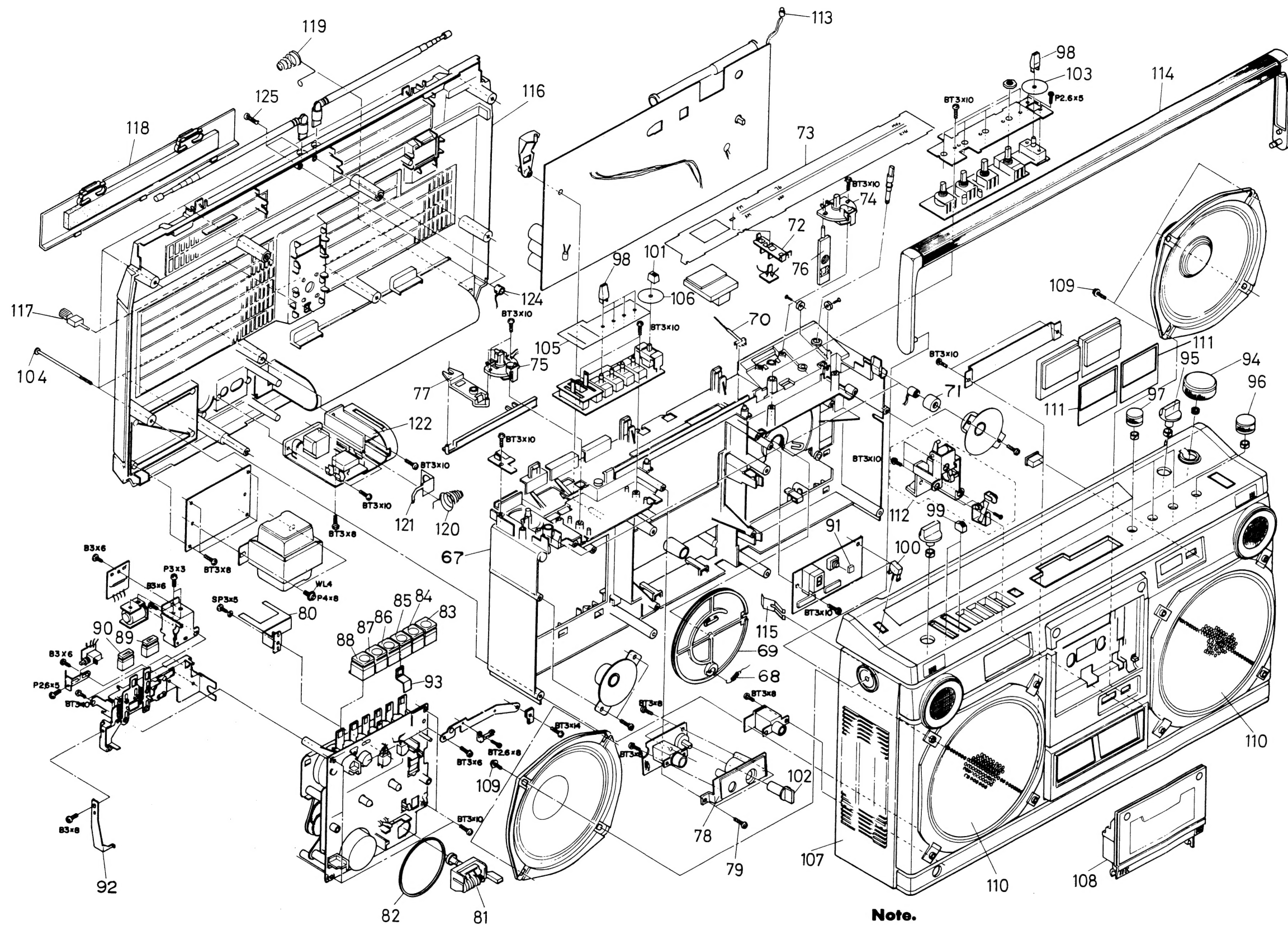
EXPLODED VIEW



Note.

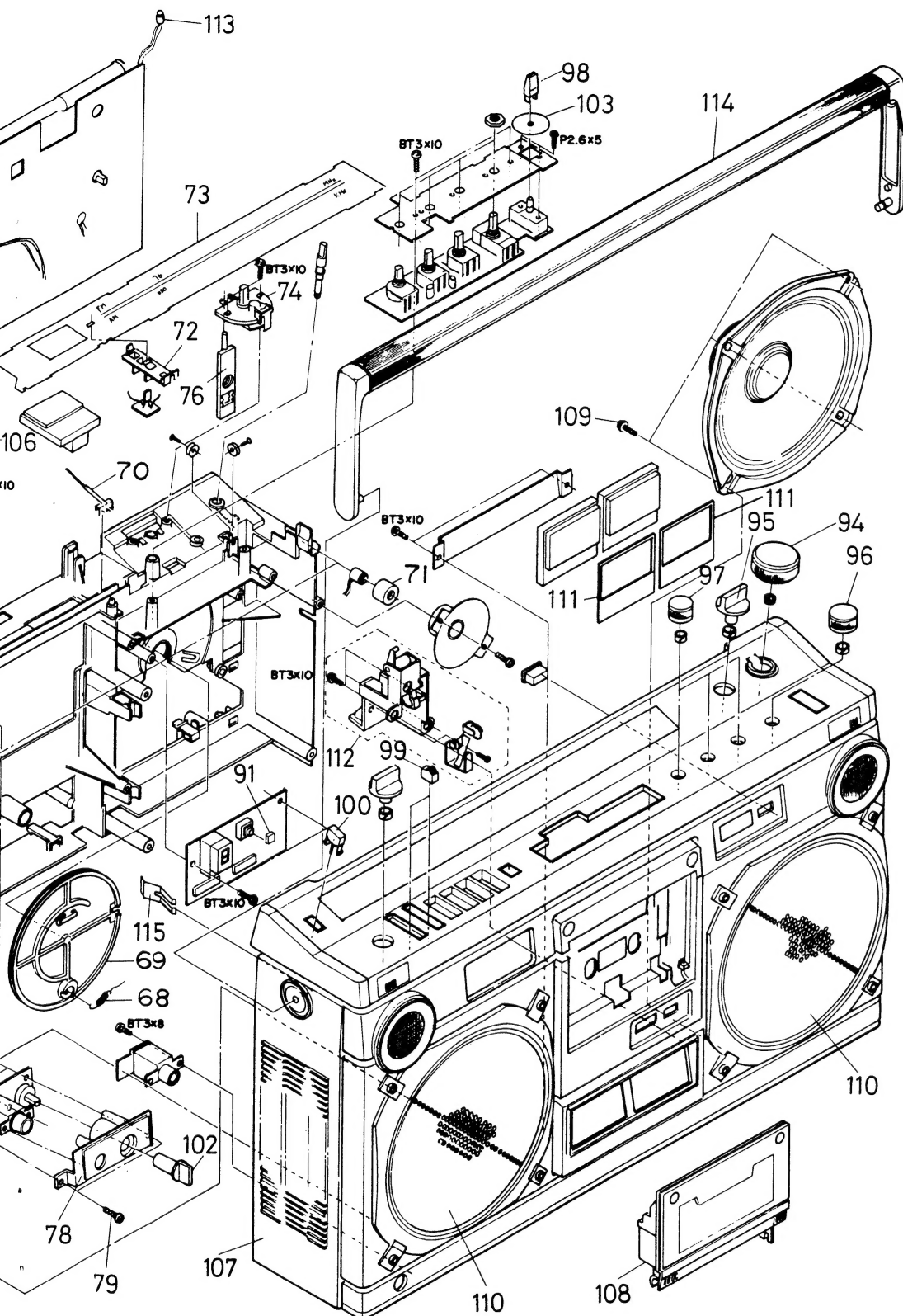
Components marked without numbers in this drawing are not specified as replacement parts.

EXPLODED VIEW














Note.

Components marked without numbers in this drawing are not specified as replacement parts.

**Note.**

Components marked without numbers in this drawing are not specified as replacement parts.

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR CASSETTE DECK ASSEMBLY (A)			FOR CASSETTE DECK ASSEMBLY (B)		
22	6741112	AS FUNCTION PLATE	67	6753431	CHASSIS ASSEMBLY
23	6741711	SWITCH FUNCTION ARM	68	6316231	SPRING M
24	7287692	SW PLATE	69	6345671	PULLEY
25	7297951	RC PLATE	70	6394211	POINTER
26	7288494	FUNCTION PLATE	71	6570061	MIC COVER
27	6308102	SPRING	72	6753381	LED HOLDER
28	6307733	SPRING	73	6467493	SCALE PLATE
29	6307711	SPRING	74	6746042	LEVER ASSEMBLY (BAND)
30	6300375	SPRING FOR RECORDING PLATE	75	6746065	FUNCTION LEVER ASSEMBLY
31	7286241	PAUSE LOCK PIECE	76	6753391	EXCHANGE LEVER (BAND)
32	7297851	RECORDING SLIDER (B)	77	6753401	EXCHANGE LEVER (FUNCTION)
33	7297841	REWIND SLIDER (B)	78	6753461	MIXING PLATE
34	7286042	PAUSE SLIDER ASSEMBLY	79	8699410	BT BIND HEAD SCREW-3MMDX10MM (BLACK)
35	7297831	STOP SLIDER (B)	80	7312811	RECROD SPRING ASSEMBLY
36	7297491	PLAY SLIDER (B)	81	5559071	COUNTER (M2)
37	7297481	FAST FORWARD SLIDER (B)	82	6354471	COUNTER BELT
38	7286193	RECORDING LOCK LEVER	83	6257321	BUTTON ASSEMBLY (STOP/EJECT)
39	7109485	MOTOR ASSEMBLY	84	6257322	BUTTON ASSEMBLY (REC)
40	5681371	COLLAR	85	6257323	BUTTON ASSEMBLY (PLAY)
41	6576083	RUBBER PLATE	86	6257324	BUTTON ASSEMBLY (REW)
42	7287815	RC LEVER	87	6257325	BUTTON ASSEMBLY (F.F)
43	6329193	F.F FUNCTION LEVER	88	6257326	BUTTON ASSEMBLY (PAUSE)
44	6304161	SPRING	89	6257311	BUTTON ASSEMBLY
45	7040081	TURNTABLE HOLDER ASSEMBLY	90	6257312	BUTTON ASSEMBLY
46	6300375	SPRING FOR RECORDING PLATE	91	6757451	SWITCH CAP
47	6301023	SPRING FOR TAKE UP ARM	92	7312531	AS SETTING OFF PLATE
48	6301001	SPRING	93	7314371	SWITCH FUNCTION LEVER
49	7286031	FR LEVER	MISCELLANEOUS		
50	6412304	TAKE UP ARM ASSEMBLY	94	6282154	KNOB ASSEMBLY-36MMD
51	6301101	SPRING	95	6283011	KNOB ASSEMBLY (FUNCTION, BAND SELECT)
52	6301233	SPRING	96	6282692	KNOB ASSEMBLY-20MMD
53	6301022	SPRING	97	6282172	KNOB ASSEMBLY-16MMD
54	6412795	FR ARM ASSEMBLY	98	6296381	SWITCH KNOB
55	6300981	SPRING	99	6295381	SLIDE KNOB
56	6301361	SPRING	100	6251101	LIGHT BUTTON
57	6323064	SPRING	101	6051631	PUSH BUTTON (REC MUTE)
58	6301721	SPRING	102	6282991	KNOB ASSEMBLY-14MMD
59	6300995	SPRING	103	7766141	SPACER
60	6372551	FLYWHEEL ASSEMBLY	104	7781303	TAPPING SCREW-3MMDX80MM
61	6357131	FLYWHEEL BELT	105	7765472	SPACER
62	6354601	BELT	106	7721765	SPACER
63	6743883	THRUST SUPPORT	107	6032203	FRONT CASE ASSEMBLY
64	6421225	AS PULLEY	107	6032204	FRONT CASE ASSEMBLY (BS)
65	7778859	POLYSLIDER WASHER	108	6092071	CASSETTE LID ASSEMBLY
66	7786621	POLYSLIDER WASHER	109	7781133	BT SCREW-3MMD

Type of head					
	P3 × 8	P	Pan head screw		BT Binding head tapping screw
	W2.6	F	Flat countersunk head screw		BL Bolt
		B	Binding head screw		W Washer
		T	Round head tapping screw		E "E" ring
Length (L mm)		 			
Diameter (D mm)					

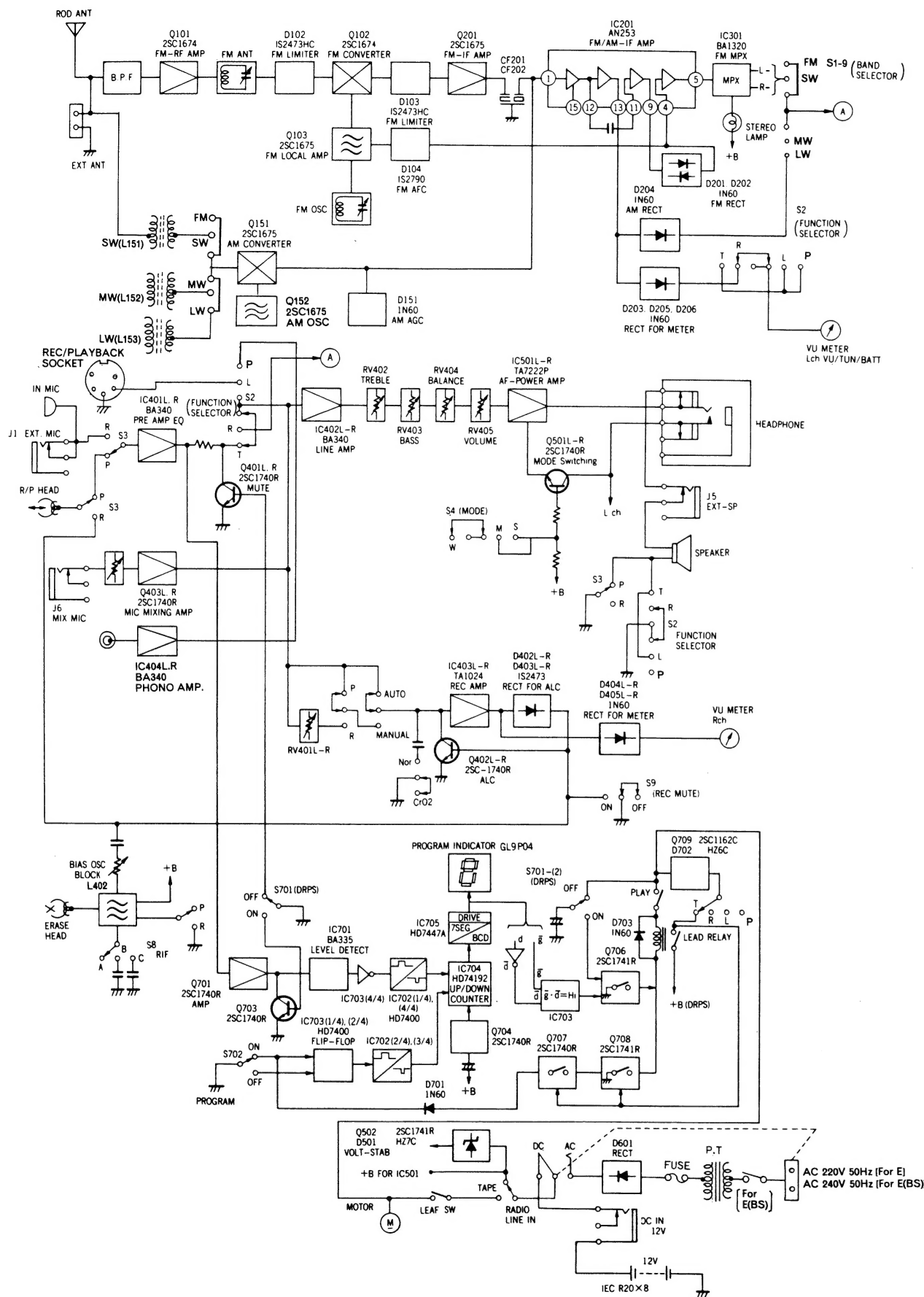
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The schematic diagram illustrates the internal circuitry of a portable stereo receiver, model IEC R20XB. The circuit is organized into several functional blocks:

- Input and Tuning Section:** Features a BPF (Band Pass Filter) and various input stages for FM (Q101, Q102, Q103), MW (Q151), and LW (Q152) bands. It includes a band selector switch (S1-9) and a function selector switch (S2).
- Frequency Conversion and Amplification:** Utilizes multiple ICs (Q101, Q102, Q103, Q151, Q152) for frequency conversion and amplification. Key components include FM/AM-IF AMP (IC201), FM/AM-IF AMP (IC301), and various diodes (D103, D104, D201, D202, D203, D205, D206) for rectification.
- Rec/Playback Section:** Includes a microphone input (J1), a tape input (J6), and a phono input (J6). It features a pre-amp EQ (IC401L), a mute switch (Q401L), and a phono amp (IC404L).
- Audio Processing and Output:** The audio signal path includes a line amp (IC402L), a balance control (RV404), a volume control (RV405), and a power amp (IC501L). The output is connected to a speaker (S3) and a headphone jack (J5).
- Program Indicator and Control:** A program indicator (GL9P04) is used to display the current program. The circuit includes a drive section (IC705) and a counter section (IC704) for program selection.
- Power Supply and Miscellaneous:** The power supply section includes a transformer (T1), a rectifier (D601), and a filter capacitor (C101). It also includes a motor (M) for the tape transport and a leaf switch (LEAF SW) for the radio line input.

The diagram is a detailed representation of the electronic components and their interconnections, providing a comprehensive view of the receiver's internal architecture.

BLOCK DIAGRAM



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